

Figure 1A. Amino acid sequence of secreted ColoUp1 protein
(I) (SEQ ID NO: 1)

TVAAGCPDQSPQLPWNPGHDQDHHVHIGQGKTLTSSATVYSIHISEGGKLVIKDHD
EPIVLRTRHILIDNGGELHAGSALCPFQGNFTIILYGRADEGIQPDPPYGLKYIGVGKG
GALELHGQKKLSWTFNLKTLHPGGMAEGGYFFERSWGHARGVIVHVIDPKSGTVIHSDRF
DTYRSKKESERLVQYLNAPVDGRILSVAVNDEGSRNLDDMARKAMTKLGSKHFLHLGFR
HPWSFLTVMGNPSSSVEDHIEYHGHRGSAAARVFKLFQTEHGEYFNVSLSSEWVQDVEW
TEWFDHDKVSQTKGGEKISDLWKAHPGKICNRPIDIQATTMDGVNLSTEVVYKKGQDYR
FACYDRGRACRSYRVRFLCGKPVPRPKLTVTIDTNVNSTILNLEDNVQSWKPGDTLVIAS
TDYSMYQAEFQVLPCRSCAPNQVKVAGKPMYLIHIGEEIDGVDMRAEVGLLSRNIIVMG
EMEDKCYPYRNHICNFFDFDTFGGHIKFALGFKAHLEGTELKHMGGQLVGQYPIHFHL
AGDVDERGGYDPTYIRDLSTHHTFSRCVTVHGSNGLLIKDVVGYNLSLGHCFFTEDGPE
ERNTFDHCLGILLVKSGLTLLPSDRDSKMCKMITEDSYPGYIPKPRQDCNAVSTFWMANPN
NNLINCAAAGSEETGFWFIFHHVPTGPSVGMSPGYSEHIPLGKFYNNRAHSNYRAGMI
IDNGVKTTEASAKDKRPFLSIISARYSPHQDADPLKPREPAIRHFIAYKNQDHGAWLR
GGDVWLDSCRFDNGIGLTLASGGTFPYDDGSKQEIKNLSLVGSGNVGTEMMDNRIWG
PGGLDHSGRTLPIGQNFPIRGIQLYDGPINIQNCTFRKFVALEGRHTSALAFLNNAWQ
SCPHNNVTGIAFEDVPITSRVFFGEPGPWFNQDMDGDKTSVFHDVDGVSVEYPGSYLT
KNDNWLVRHPDCINVPDWRGAICSGCYAQMYIQAYKTSNLRMKIIKNDFPSHPLYLEGA
LTRSTHYQQYQPVVTLQKGYTIHWDQTAPAEALAIWLINFNKGDWIRVGLCYPRGTTFSI
LSDVHNRLKQTSKTGVFVRTLQMDKVEQSYPGRSHYYWDEDSGLLFLKLKAQNEREF
AFCSMKGCEKIKALIPKNAGVSDCTATAYPKFTERAVVDVPMKKLFGSQLKTKDHF
LEVKMESKQHFHLWNDFAFIEVDGKKYPSSSEDGIQVVVIDGNQGRVVSHTSFRNSIL
QGIPWQLFNIVATIPDNSIVLMASKGRYVSRGPWTRVLEKLGADRGLKLKEQMAFVGFK
GSFRPIWVTLDTEDHKAKIFQVVPIPVVKKKKL

Figure 1B. Amino acid sequence of secreted ColoUp1 protein (II) (SEQ ID NO: 2)

AGCPDQSPQLQPNPGHDQDHHVHIGQGKTLTSSATVYSIHISEGGKLVIKDHDEPI
VLRTRHILIDNGGELHAGSALCPFQGNFTIILYGRADEGIQPDPIYGLKYIGVGKGGAL
ELHGQKKLSWTFNLKTLHPGGMAEGGYFFERSWGHARGVIVHVIDPKSGTVIHSDRFDY
RSKKESERLVQYLNAVDPGRILSVAVNDEGSRNLDDMARKAMTKLGSKHFLHLGFRHPW
SFLTVMGNPSSSVEDHIEYHGHGRGSAAARVFKLFQTEHGEYFNVSLSSSEWVQDVEWTEW
FDHDKVSQTKGGEKISDLWKAHPGKICNRPIDIQATTMDGVNLSTEVVYKKGQDYRFAC
YDRGRACRSYRVRFCLGKPVPRKLTVTIDTNVNSTILNLEDNVQSWKPGDTLVIASTDY
SMYQAEFQVLPCRSCAPNQVKVAGKPMYLIHIGEEIDGVDMAEVGLLSRNIIVMGEME
DKCYPYRNHICNFFDFDTFGGHIKFAFGKAAHLEGTELKHMGGQLVGQYPIHFHLAGD
VDERGGYDPPTYIRDLSIHHTFSRCVTVHGSNGLLIKDVVGYNLSLGHCFFTEDGPEERN
TFDHCLGLLVKSGTLLPSDRDSKMCKMITEDSYPGYIPKPRQDCNAVSTFWMANPNNNL
INCAAAGSEETGFWFIFHHVPTGPSVGMSPGYSEHIPGKGFYNNRAHSNYRAGMIIDN
GVKTTEASAKDKRPFLSIISARYSPHQDADPLKPREPAIRHFIAYKNQDHGAWLRGGD
VWLDSRCFADNGIGLTLASGGTFPYDDGSKQEIKNLSLFVGESGNVGTMMNDNRIWGP
LDHSGRTLPIGQNFPIRGIQLYDGPINIQNCTFRKFVALEGRHTSALAFRLNNAWQSCP
HNNVTGIAFEDVPITSRVFFGEPGPWFNQLDMDGDKTSVFHDVDGSVSEYPGSYLT
KNLWVRHPDCINVPDWRGAICSGCYAQMYIQAYKTSNLRMKIKNDFPSHPLYLEGALTR
STHYQQYQPVVTLQKGYTIHWDQTAPAEIAIWLINFNKGDWIRVGLCYPRGTTFSILSD
VHNRLKQTSKTGVFVRTLQMDKVEQSYPGRSHYYWDEDSGLLFLKLKAQNEREKFAFC
SMKGCERIKIKALIPKNAGVSDCTATAYPKFTERAVVDVPMPKKLFGSQLKTKDHFLEV
KMESSKQHFHFLWNDFAYIEVDGKKYPSSDGIQVVVIDGNQGRVVSHTSFRNSILQGI
PWQLFNYVATIPDNSIVLMASKGRYVSRGPWTRVLEKLGADRGLKLKEQMAFVGFKGSF
RPIWVTLDTEDHKAKIFQVVPPIPVVKKKKL

Figure 2. Amino acid sequence of secreted ColoUp2 protein
(SEQ ID NO: 3)

LQEVHVSKETIGKISAASKMMWCSAAVDIMFLLDGSNSVGKGSFERSKHFAITVCDGLD
ISPERVRVGAFQFSSTPHLEFPLDSFSTQQEVKARIKRMVFKGGRTETELALKYLLHRG
LPGGRNASVPQILIIVTDGKSQGDVALPSKQLKERGVTVFAVGVRFPWRWHEELHALASEP
RGQHVLLAEQVEDATNGLFSTLSSSAICSSATPDCRVEAHPCEHRTLEMVREFAGNAPC
WRGSRRTLAVLAAHCPFYSWKRVLTHPATCYRTTCPGPCDSQPCQNGGTCVPEGLDGY
QCLCPLAFGGEANCALKLSLECRVDLLFLLDSSAGTTLDGFLRAKVFKRFVRAVLSED
SRARVGVATYSRELLVAVPVGEYQDVVDLVWSLDGIPFRGGPTLTGSALRQAAERGFGS
ATRGTQDRPRRVVLLTESHSEDEVAGPARHARARELLLLGVGSEAVRAELEEITGSPK
HVMVYSDPQDLFNQIPELQGKLCSRQRPQCRTQALDLVFMLDTSASVGPENFAQMOSFV
RSCALQFEVNPDVTQVGLVYGSQVQTAFGLDTKPTRAAMLRAISQAPYLGGVGSAGTA
LLHIYDKVMTVQRGARPGVPKAVVVLTGGRGAEDAAVPAQKLRNNGISVLVVGVPVLS
EGLRRLAGPRDSLHVAAYADLRYHQDVLIEWLCGEAKQPVNLCKPSPCMNEGSCVLQN
GSYRCKCRDGWEGPHCENRFLRRP

Figure 3. Nucleic acid sequence of ColoUp1 (SEQ ID NO: 4)

CGTGACACTGTCTCGGCTACAGACCCAGAGGGAGCACACTGCCAGGATGGGAGCTGCTG
GGAGGCAGGACTTCCTCTTCAAGGCCATGCTGACCATCAGCTGGCTCACTCTGACCTGC
TTCCCTGGGGCCACATCCACAGTGGCTGCTGGGTGCCCTGACCAGAGCCCTGAGTTGCA
ACCCTGGAACCCTGGCCATGACCAAGACCACCATGTGCATATCGGCCAGGGCAAGACAC
TGCTGCTCACCTCTTCTGCCACGGTCTATTCCATCCACATCTCAGAGGGAGGCAAGCTG
GTCATTAAAGACCACGACGAGCCGATTGTTTTGCGAACCCGGCACATCCTGATTGACAA
CGGAGGAGAGCTGCATGCTGGGAGTGCCCTCTGCCCTTCCAGGGCAATTTACCATCA
TTTTGTATGGAAGGGCTGATGAAGGTATTCAGCCGGATCCTTACTATGGTCTGAAGTAC
ATTGGGGTTGGTAAAGGAGGCGCTCTTGAGTTGCATGGACAGAAAAAGCTCTCCTGGAC
ATTTCTGAACAAGACCCTTCACCCAGGTGGCATGGCAGAAGGAGGCTATTTTTTTGAAA
GGAGCTGGGGCCACCGTGGAGTTATTGTTTCATGTCATCGACCCAAATCAGGCACAGTC
ATCCATTCTGACCGGTTTGACACCTATAGATCCAAGAAAGAGAGTGAACGTCTGGTCCA
GTATTTGAACGCGGTGCCCGATGGCAGGATCCTTTCTGTTGCAGTGAATGATGAAGGTT
CTCGAAATCTGGATGACATGGCCAGGAAGGCGATGACCAAATTGGGAAGCAAACACTTC
CTGCACCTTGGATTTAGACACCCTTGGAGTTTTCTAACTGTGAAAGGAAATCCATCATC
TTCAGTGAAGACCATATTGAATATCATGGACATCGAGGCTCTGCTGCTGCCCGGGTAT
TCAAATTGTTCCAGACAGAGCATGGCGAATATTTCAATGTTTCTTTGTCCAGTGAGTGG
GTTCAAGACGTGGAGTGGACGGAGTGGTTCGATCATGATAAAGTATCTCAGACTAAAGG
TGGGGAGAAAATTTAGACCTCTGGAAAGCTCACCCAGGAAAAATATGCAATCGTCCCA
TTGATATACAGGCCACTACAATGGATGGAGTTAACCTCAGCACCGAGGTTGTCTACAAA
AAAGGCCAGGATTATAGGTTTGCTTGCTACGACCGGGGCAGAGCCTGCCGGAGCTACCG
TGTACGGTTCTCTGTGGGAAGCCTGTGAGGCCCAAACCTCACAGTCACCATTGACACCA
ATGTGAACAGCACCATTCTGAACTTGGAGGATAATGTACAGTCATGGAAACCTGGAGAT
ACCCTGGTCATTGCCAGTACTGATTACTCCATGTACCAGGCAGAAGAGTTCCAGGTGCT
TCCCTGCAGATCCTGCGCCCCCAACCAGGTCAAAGTGGCAGGGAAACCAATGTACCTGC
ACATCGGGGAGGAGATAGACGGCGTGGACATGCGGGCGGAGGTTGGGCTTCTGAGCCGG
AACATCATAGTGATGGGGGAGATGGAGGACAAATGCTACCCCTACAGAAACCACATCTG
CAATTTCTTTGACTTCGATACCTTTGGGGGCCACATCAAGTTTGCTCTGGGATTTAAGG
CAGCACACTTGGAGGGCACGGAGCTGAAGCATATGGGACAGCAGCTGGTGGGTCAGTAC
CCGATTCACTTCCACCTGGCCGGTGATGTAGACGAAAGGGGAGGTTATGACCCACCCAC
ATACATCAGGGACCTCTCCATCCATCATACTTCTCTCGCTGCGTCACAGTCCATGGCT
CCAATGGCTTGTTGATCAAGGACGTTGTGGGCTATAACTCTTTGGGGCACTGCTTCTTC
ACGGAAGATGGGCCGGAGGAACGCAACACTTTTGACCACTGTCTTGGCCTCCTTGTCAA
GTCTGGAACCCTCCTCCCCCTCGGACCGTGACAGCAAGATGTGCAAGATGATCACAGAGG
ACTCCTACCCAGGGTACATCCCCAAGCCCAGGCAAGACTGCAATGCTGTGTCCACCTTC
TGGATGGCCAATCCCAACAACAACCTCATCAACTGTGCCGCTGCAGGATCTGAGGAAAC
TGGATTTTGGTTTATTTTTACCCACGTACCAACGGGCCCTCCGTGGGAATGTACTCCC
CAGGTTATTTCAGAGCACATTCCACTGGGAAAATTCTATAACAACCGAGCACATTCCAAC
TACCGGGCTGGCATGATCATAGACAACGGAGTCAAAACCACCGAGGCCTCTGCCAAGGA
CAAGCGGCCGTTCTCTCAATCATCTCTGCCAGATACAGCCCTCACCAGGACGCCGACC
CGCTGAAGCCCCGGGAGCCGGCCATCATCAGACACTTCATTGCCTACAAGAACCAGGAC
CACGGGGCCTGGCTGCGCGGCGGGGATGTGTGGCTGGACAGCTGCCGGTTTGCTGACAA
TGGCATTGGCCTGACCCTGGCCAGTGGTGGAACTTCCCGTATGACGACGGCTCCAAGC
AAGAGATAAAGAACAGCTTGTTTGTGGCGAGAGTGGCAACGTGGGGACGGAAATGATG
GACAATAGGATCTGGGGCCCTGGCGGCTTGGACCATAGCGGAAGGACCCCTCCCTATAGG

CCAGAATTTTCCAATTAGAGGAATTCAGTTATATGATGGCCCCATCAACATCCAAAAC
GCACTTTCCGAAAGTTTGTGGCCCTGGAGGGCCGGCACACCAGCGCCCTGGCCTTCCGC
CTGAATAATGCCTGGCAGAGCTGCCCCATAACAACGTGACCGGCATTGCCTTTGAGGA
CGTTCCGATTACTTCCAGAGTGTTCTTCGGAGAGCCTGGGCCCTGGTTCAACCAGCTGG
ACATGGATGGGGATAAGACATCTGTGTTCCATGACGTCGACGGCTCCGTGTCCGAGTAC
CCTGGCTCCTACCTCACGAAGAATGACAACTGGCTGGTCCGGCACCCAGACTGCATCAA
TGTTCCCGACTGGAGAGGGGCCATTTGCAGTGGGTGCTATGCACAGATGTACATTCAAG
CCTACAAGACCAGTAACCTGCGAATGAAGATCATCAAGAATGACTTCCCCAGCCACCCT
CTTTACCTGGAGGGGGCGCTCACCAGGAGCACCCATTACCAGCAATACCAACCGGTTGT
CACCTGCGAGAAGGGCTACACCATCCACTGGGACCAGACGGCCCCCGCCGAACTCGCCA
TCTGGCTCATCAACTTCAACAAGGGCGACTGGATCCGAGTGGGGCTCTGCTACCCGCGA
GGCACCACATTCTCCATCCTCTCGGATGTTCACAATCGCCTGCTGAAGCAAACGTCCAA
GACGGGCGTCTTCGTGAGGACCTTGACAGATGGACAAAGTGGAGCAGAGCTACCCTGGCA
GGAGCCACTACTACTGGGACGAGGACTCAGGGCTGTTGTTTCTGAAGCTGAAAGCTCAG
AACGAGAGAGAGAAGTTTGCTTTCTGCTCCATGAAAGGCTGTGAGAGGATAAAGATTAA
AGCTCTGATTCCAAAGAACGCAGGCGTCAGTGACTGCACAGCCACAGCTTACCCCAAGT
TCACCGAGAGGGCTGTCGTAGACGTGCCGATGCCCAAGAAGCTCTTTGGTTCTCAGCTG
AAAACAAAGGACCATTTCTTGGAGGTGAAGATGGAGAGTTCCAAGCAGCACTTCTTCCA
CCTCTGGAACGACTTCGCTTACATTGAAGTGGATGGGAAGAAGTACCCAGTTTCGGAGG
ATGGCATCCAGGTGGTGGTGATTGACGGGAACCAAGGGCGCGTGGTGAGCCACACGAGC
TTCAGGAACTCCATTCTGCAAGGCATACCATGGCAGCTTTTCAACTATGTGGCGACCAT
CCCTGACAATTCCATAGTGCTTATGGCATCAAAGGGAAGATACGTCTCCAGAGGCCCAT
GGACCAGAGTGCTGGAAAAGCTTGGGGCAGACAGGGGTCTCAAGTTGAAAGAGCAAATG
GCATTTCGTTGGCTTCAAAGGCAGCTTCCGGCCCATCTGGGTGACACTGGACACTGAGGA
TCACAAAGCCAAAATCTTCCAAGTTGTGCCCATCCCTGTGGTGAAGAAGAAGAAGTTGT
GAGGACAGCTGCCGCCCGGTGCCACCTCGTGGTAGACTATG

Figure 4. Nucleic acid sequence of ColoUp2 (SEQ ID NO: 5)

GCCCCCTGGCCCGAGCCGCGCCCGGGTCTGTGAGTAGAGCCGCCCGGGCACCGAGCGCT
 GGTGCGCCGCTCTCCTTCCGTTATATCAACATGCCCCCTTTCTGTTGCTGGAAGCCGTC
 TGTGTTTTCTGTTTTTCCAGAGTGCCCCCATCTCTCCCTCTCCAGGAAGTCCATGTAAG
 CAAAGAAACCATCGGGAAGATTTTCTGCTGCCAGCAAAATGATGTGGTGCTCGGCTGCAG
 TGGACATCATGTTTCTGTTAGATGGGTCTAACAGCGTCGGGAAAGGGAGCTTTGAAAGG
 TCCAAGCACTTTGCCATCACAGTCTGTGACGGTCTGGACATCAGCCCCGAGAGGGTCAG
 AGTGGGAGCATTCCAGTTCAGTTCCACTCCTCATCTGGAATCCCCTTGGATTCAATTTT
 CAACCCAACAGGAAGTGAAGGCAAGAATCAAGAGGATGGTTTTTCAAAGGAGGGCGCACG
 GAGACGGAACCTTGCTCTGAAATACCTTCTGCACAGAGGGTTGCCTGGAGGCAGAAATGC
 TTCTGTGCCCCAGATCCTCATCATCGTCACTGATGGGAAGTCCAGGGGGATGTGGCAC
 TGCCATCCAAGCAGCTGAAGGAAAGGGGTGTCACTGTGTTTGCTGTGGGGGTGAGGTTT
 CCCAGGTGGGAGGAGCTGCATGCACTGGCCAGCGAGCCTAGAGGGCAGCACGTGCTGTT
 GGCTGAGCAGGTGGAGGATGCCACCAACGGCCTCTTCAGCACCCCTCAGCAGCTCGGCCA
 TCTGCTCCAGCGCCACGCCAGACTGCAGGGTCGAGGCTCACCCCTGTGAGCACAGGACG
 CTGGAGATGGTCCGGGAGTTTCGCTGGCAATGCCCCATGCTGGAGAGGATCGCGGCGGAC
 CCTTGCGGTGCTGGCTGCACACTGTCCCTTCTACAGCTGGAAGAGAGTGTTCTTAACCC
 ACCCTGCCACCTGCTACAGGACCACCTGCCAGGCCCTGTGACTCGCAGCCCTGCCAG
 AATGGAGGCACATGTGTTCCAGAAGGACTGGACGGCTACCAGTGCCTCTGCCCCGTGGC
 CTTTGGAGGGGAGGCTAACTGTGCCCTGAAGCTGAGCCTGGAATGCAGGGTCGACCTCC
 TCTTCCTGCTGGACAGCTCTGCGGGCACCCTCTGGACGGCTTCCTGCGGGCCAAAGTC
 TTCGTGAAGCGGTTTTGTGCGGGCCGTGCTGAGCGAGGACTCTCGGGCCCGAGTGGGTGT
 GGCCACATACAGCAGGGAGCTGCTGGTGGCGGTGCCTGTGGGGGAGTACCAGGATGTGC
 CTGACCTGGTCTGGAGCCTCGATGGCATTCCCTTCCGTGGTGGCCCCACCCTGACGGGC
 AGTGCCTTGCGGCAGGCGGCAGAGCGTGGCTTCGGGAGCGCCACCAGGACAGGCCAGGA
 CCGGCCACGTAGAGTGGTGGTTTTGTCTCACTGAGTCACACTCCGAGGATGAGGTTGCGG
 GCCCAGCGCGTCACGCAAGGGCGCGAGAGCTGCTCCTGCTGGGTGTAGGCAGTGAGGCC
 GTGCGGGCAGAGCTGGAGGAGATCACAGGCAGCCCAAAGCATGTGATGGTCTACTCGGA
 TCCTCAGGATCTGTTCAACCAAATCCCTGAGCTGCAGGGGAAGCTGTGCAGCCGGCAGC
 GGCCAGGGTGCCGGACACAAGCCCTGGACCTCGTCTTCATGTTGGACACCTCTGCCTCA
 GTAGGGCCCGAGAATTTTGTCTCAGATGCAGAGCTTTGTGAGAAGCTGTGCCCTCCAGTT
 TGAGGTGAACCCTGACGTGACACAGGTGCGCCTGGTGGTGTATGGCAGCCAGGTGCAGA
 CTGCCTTCGGGCTGGACACCAAACCCACCCGGGCTGCGATGCTGCGGGCCATTAGCCAG
 GCCCCCTACCTAGGTGGGGTGGGCTCAGCCGGCACCCGCCCTGCTGCACATCTATGACAA
 AGTGATGACCGTCCAGAGGGGTGCCCGGCCTGGTGTCCCCAAAGCTGTGGTGGTGCTCA
 CAGGCGGGAGAGGCGCAGAGGATGCAGCCGTTCCCTGCCCAGAAGCTGAGGAACAATGGC
 ATCTCTGTCTTGGTCGTGGGCGTGGGGCCTGTCTTAAGTGAGGGTCTGCGGAGGCTTGC
 AGGTCCCCGGGATTCCCTGATCCACGTGGCAGCTTACGCCGACCTGCGGTACCACCAGG
 ACGTGCTCATTGAGTGGCTGTGTGGAGAAGCCAAGCAGCCAGTCAACCTCTGCAAACCC
 AGCCCGTGTCATGAATGAGGGCAGCTGCGTCCTGCAGAATGGGAGCTACCGCTGCAAGTG
 TCGGGATGGCTGGGAGGGCCCCCACTGCGAGAACCGATTCTTGAGACGCCCTGAGGCA
 CATGGCTCCCGTGCAGGAGGGCAGCAGCCGTACCCCTCCAGCAACTACAGAGAAGGCC
 TGGGCACTGAAATGGTGCTACCTTCTGGAATGTCTGTGCCCCAGGTCTTAGAATGTC
 TGCTTCCCGCCGTGGCCAGGACCACTATTCTCACTGAGGGAGGAGGATGTCCCAACTGC
 AGCCATGCTGCTTAGAGACAAGAAAGCAGCTGATGTACCCACAAACGATGTTGTTGAA
 AAGTTTTGATGTGTAAGTAAATACCCACTTTCTGTACCTGCTGTGCCTTGTTGAGGCTA

TGTCATCTGCCACCTTTCCCTTGAGGATAAAACAAGGGTCCTGAAGACTTAAATTTAGC
GGCCTGACGTTTCCTTTGCACACAATCAATGCTCGCCAGAATGTTGTTGACACAGTAATG
CCCAGCAGAGGCCTTTACTAGAGCATCCTTTGGACGG

Figure 5. Nucleic acid sequence of Osteopontin (SEQ ID NO: 6)

GCAGAGCACAGCATCGTCGGGACCAGACTCGTCTCAGGCCAGTTGCAGCCTTCTCAGCC
AAACGCCGACCAAGGAAAACACTACTACCATGAGAATTGCAGTGATTTGCTTTTGCCTCC
TAGGCATCACCTGTGCCATAACAGTTAAACAGGCTGATTCTGGAAGTTCTGAGGAAAAG
CAGCTTTACAACAAATACCCAGATGCTGTGGCCACATGGCTAAACCCCTGACCCATCTCA
GAAGCAGAATCTCCTAGCCCCACAGACCCTTCCAAGTAAGTCCAACGAAAGCCATGACC
ACATGGATGATATGGATGATGAAGATGATGATGACCATGTGGACAGCCAGGACTCCATT
GACTCGAACGACTCTGATGATGTAGATGACACTGATGATTCTCACCAGTCTGATGAGTC
TCACCATTCTGATGAATCTGATGAACTGGTCACTGATTTTCCACGGACCTGCCAGCAA
CCGAAGTTTTCACTCCAGTTGTCCCCACAGTAGACACATATGATGGCCGAGGTGATAGT
GTGGTTTATGGACTGAGGTCAAATCTAAGAAGTTTCGCAGACCTGACATCCAGTACCC
TGATGCTACAGACGAGGACATCACCTCACACATGGAAAAGCGAGGAGTTGAATGGTGCAT
ACAAGGCCATCCCCGTTGCCCAGGACCTGAACGCGCCTTCTGATTGGGACAGCCGTGGG
AAGGACAGTTATGAAACGAGTCAGCTGGATGACCAGAGTGCTGAAACCCACAGCCACAA
GCAGTCCAGATTATATAAGCGGAAAGCCAATGATGAGAGCAATGAGCATTCCGATGTGA
TTGATAGTCAGGAACCTTCCAAAGTCAGCCGTGAATTCCACAGCCATGAATTTACAGC
CATGAAGATATGCTGGTTGTAGACCCCAAAGTAAGGAAGAAGATAAACACCTGAAATT
TCGTATTTCTCATGAATTAGATAGTGCATCTTCTGAGGTCAATTAAAAGGAGAAAAAAT
ACAATTTCTCACTTTGCATTTAGTCAAAAGAAAAAATGCTTTATAGCAAAATGAAAGAG
AACATGAAATGCTTCTTTCTCAGTTTATTGGTTGAATGTGTATCTATTTGAGTCTGGAA
ATAACTAATGTGTTTGATAATTAGTTTAGTTTGTGGCTTCATGGAACTCCCTGTAAAC
TAAAAGCTTCAGGGTTATGTCTATGTTTATTCTATAGAAGAAATGCAAATCTACTGT
ATTTTAATATTTGTTATTCTCTCATGAATAGAAATTTATGTAGAAGCAAACAAAATACT
TTTACCCACTTAAAAAGAGAATATAACATTTTATGTCACTATAATCTTTTGTTTTTTAA
GTTAGTGTATATTTTGTGTTGTGATTATCTTTTTGTGGTGTGAATAAATCTTTTATCTTGA
ATGTAATAAGAATTTGGTGGTGTCAATTGCTTATTTGTTTTCCACGGTTGTCCAGCAA
TTAATAAAACATAACCTTTTTTACTGCCTAAAAAAAAAAAAAAAAAAAAA

Figure 6. Nucleic acid sequence of ColoUp3 (SEQ ID NO: 7)

AAAGGGGCAAGAGCTGAGCGGAACACCGGCCCGCCGTCGCGGCAGCTGCTTCACCCCTC
TCTCTGCAGCCATGGGGCTCCCTCGTGGACCTCTCGCGTCTCTCCTCCTTCTCCAGGTT
TGCTGGCTGCAGTGC CGCGGCCTCCGAGCCGTGCCGGGCGGTCTTCAGGGAGGCTGAAGT
GACCTTGAGGCGGGAGGCGCGGAGCAGGAGCCCGGCCAGGCGCTGGGGAAAGTATTCA
TGGGCTGCCCTGGGCAAGAGCCAGCTCTGTTTAGCACTGATAATGATGACTTCACTGTG
CGGAATGGCGAGACAGTCCAGGAAAGAAGGTCACCTGAAGGAAAGGAATCCATTGAAGAT
CTTCCCATCCAAACGTATCTTACGAAGACACAAGAGAGATTGGGTGGTTGCTCCAATAT
CTGTCCCTGAAAATGGCAAGGGTCCCTTCCCCCAGAGACTGAATCAGCTCAAGTCTAAT
AAAGATAGAGACACCAAGATTTTCTACAGCATCACGGGGCCGGGGGCAGACAGCCCCC
TGAGGGTGTCTTCGCTGTAGAGAAGGAGACAGGCTGGTTGTTGTTGAATAAGCCACTGG
ACCGGGAGGAGATTGCCAAGTATGAGCTCTTTGGCCACGCTGTGTGAGAGAAATGGTGCC
TCAGTGAGGAGCCCCATGAACATCTCCATCATCGTGACCGACCAGAATGACCACAAGCC
CAAGTTTACCCAGGACACCTTCCGAGGGAGTGTCTTAGAGGGAGTCCTACCAGGTACTT
CTGTGATGCAGGTGACAGCCACGGATGAGGATGATGCCATCTACACCTACAATGGGGTG
GTTGCTTACTCCATCCATAGCCAAGAACCAAAGGACCCACACGACCTCATGTTCAACAT
TCACCGGAGCACAGGCACCATCAGCGTCATCTCCAGTGGCCTGGACCGGGAAAAAGTCC
CTGAGTACACACTGACCATCCAGGCCACAGACATGGATGGGGACGGCTCCACCACCACG
GCAGTGGCAGTAGTGGAGATCCTTGATGCCAATGACAATGCTCCCATGTTTGACCCCCA
GAAGTACGAGGCCCATGTGCCTGAGAATGCAGTGGGCCATGAGGTGCAGAGGCTGACGG
TCACTGATCTGGACGCCCCCAACTCACCAGCGTGGCGTGCCACCTACCTTATCATGGGC
GGTGACGACGGGGACCATTTTACCATCACCACCCACCCCTGAGAGCAACCAGGGCATCCT
GACAACCAGGAAGGGTTTGGATTTTGGAGGCCAAAAACCAGCACACCCTGTACGTTGAAG
TGACCAACGAGGCCCTTTTGTGCTGAAGCTCCCAACCTCCACAGCCACCATAGTGGTC
CACGTGGAGGATGTGAATGAGGCACCTGTGTTTGTCCCACCCTCCAAAGTCGTTGAGGT
CCAGGAGGGCATCCCCACTGGGGAGCCTGTGTGTGTCTACACTGCAGAAGACCCTGACA
AGGAGAATCAAAGATCAGCTACCGCATCCTGAGAGACCCAGCAGGGTGGCTAGCCATG
GACCCAGACAGTGGGCAGGTACAGCTGTGGGCACCCTCGACCGTGAGGATGAGCAGTT
TGTGAGGAACAACATCTATGAAGTCATGGTCTTGCCATGGACAATGGAAGCCCTCCCA
CCACTGGCACGGGAACCTTCTGCTAACACTGATTGATGTCAATGACCATGGCCCAGTC
CCTGAGCCCCGTCAGATCACCATCTGCAACCAAAGCCCTGTGCGCCAGGTGCTGAACAT
CACGGACAAGGACCTGTCTCCCCACACCTCCCTTTCCAGGCCAGCTCACAGATGACT
CAGACATCTACTGGACGGCAGAGGTCAACGAGGAAGGTGACACAGTGGTCTTGTCCCTG
AAGAAGTTCCTGAAGCAGGATACATATGACGTGCACCTTTCTCTGTCTGACCATGGCAA
CAAAGAGCAGCTGACGGTGATCAGGGCCACTGTGTGCGACTGCCATGGCCATGTGCGAAA
CCTGCCCTGGACCCTGGAAGGGAGGTTTTCATCCTCCCTGTGCTGGGGGCTGTCTGGCT
CTGCTGTTCTCTCTGCTGGTGCTGCTTTTGTGTTGGTGAGAAAGAAGCGGAAGATCAAGGA
GCCCCCTCTACTCCCAGAAGATGACACCCGTGACAACGTCTTCTACTATGGCGAAGAGG
GGGGTGGCGAAGAGGACCAGGACTATGACATCACCCAGCTCCACCGAGGTCTGGAGGCC
AGGCCGGAGGTGGTTCTCCGCAATGACGTGGCACCAACCATCATCCCGACACCCATGTA
CCGTCTCTCGGCCAGCCAACCCAGATGAAATCGGCAACTTTATAATTGAGAACCTGAAGG
CGGCTAACACAGACCCCCACAGCCCCGCCCTACGACACCCCTCTTGGTGTTTCGACTATGAG
GGCAGCGGCTCCGACGCCGCGTCCCTGAGCTCCCTCACCTCCTCCGCCTCCGACCAAGA
CCAAGATTACGATTATCTGAACGAGTGGGGCAGCCGCTTCAAGAAGCTGGCAGACATGT
ACGGTGGCGGGGAGGACGACTAGGCGGCCTGCCTGCAGGGCTGGGGACCAACGTCAGG
CCACAGAGCATCTCCAAGGGGTCTCAGTTCCTCCCTTCAGCTGAGGACTTCGGAGCTTGT

CAGGAAGTGGCCGTAGCAACTTGGCGGAGACAGGCTATGAGTCTGACGTTAGAGTGGTT
GCTTCCTTAGCCTTTCAGGATGGAGGAATGTGGGCAGTTTGACTTCAGCACTGAAAACC
TCTCCACCTGGGCCAGGGTTGCCTCAGAGGCCAAGTTTCCAGAAGCCTCTTACCTGCCG
TAAAATGCTCAACCCTGTGTCTTGGGCCTGGGCCTGCTGTGACTGACCTACAGTGGACT
TTCTCTCTGGAATGGAACCTTCTTAGGCCTCCTGGTGCAACTTAATTTTTTTTTTTAAT
GCTATCTTCAAAACGTTAGAGAAAGTTCTTCAAAAGTGCAGCCCAGAGCTGCTGGGCCC
ACTGGCCGTCCTGCATTTCTGGTTTCCAGACCCCAATGCCTCCCATTTCGGATGGATCTC
TGCGTTTTTATACTGAGTGTGCCTAGGTTGCCCCTTATTTTTTTATTTTCCCTGTTGCGT
TGCTATAGATGAAGGGTGAGGACAATCGTGTATATGTACTAGAACTTTTTTTATTAAAGA
AACTTTTCCCAGAAAAAAA

Figure 7. Nucleic acid sequence of ColoUp4 (SEQ ID NO: 8)

ATGAAGCACCTGAAGCGGTGGTGGTCGGCCGGCGGCCTCCTGCACCTCACCCCTCCT
GCTGAGCTTGGCGGGGCTCCGCGTAGACCTAGATCTTTACCTGCTGCTGCCGCCGCCA
CCCTGCTGCAGGACGAGCTGCTGTTCTTGGGCGGCCCGGCCAGCTCCGCCTACGCGCTC
AGCCCCTTCTCGGCCTCGGGAGGGTGGGGGCGCGCGGGCCACTTGCACCCCAAGGGCCG
GGAGCTGGACCCCTGCCGCGCCGCCGAGGGCCAGCTGCTCCGGGAGGTGCGCGCGCTCG
GGGTCCCCTTCGTCCCTCGCACCAGCGTGGATGCATGGCTGGTGCACAGCGTGGCTGCC
GGGAGCGCGGACGAGGCCACGGGCTGCTCGGCGCCGCCGCCGCTCGTCCACCGGAGG
AGCCGGCGCCAGCGTGGACGGCGGCAGCCAGGCTGTGCAGGGGGGCGGCGGGGACCCCC
GAGCGGCTCGGAGTGGCCCCCTTGGACGCCGGGAAGAGGAGAAGGCACCCGCGGAACCG
ACGGCTCAGGTGCCGGACGCTGGCGGATGTGCGAGCGAGGAGAATGGGGTACTAAGAGA
AAAGCACGAAGCTGTGGATCATAGTTCCAGCATGAGGAAAATGAAGAAAGGGTGTGAG
CCCAGAAGGAGAACTCACTTCCAGCAGAATGATGATGATGAAAACAAAATAGCAGAGAAA
CCTGACTGGGAGGCAGAAAAGACCACTGAATCTAGAAATGAGAGACATCTGAATGGGAC
AGATACTTCTTTCTCTCTGGAAGACTTATTCCAGTTGCTTTTATCACAGCCTGAAAATT
CACTGGAGGGCATCTCATTGGGAGATATTCCTCTTCCAGGCAGTATCAGTGATGGCATG
AATTCTTCAGCACATTATCATGTAACTTCAGCCAGGCTATAAGTCAGGATGTGAATCT
TCATGAGGCCATCTTGCTTTGTCCCAACAATACATTTAGAAGAGATCCAACAGCAAGGA
CTTCACAGTCACAAGAACCATTCTGCAGTTAAATTCTCATAACCAATCCTGAGCAA
ACCCTTCTGGAATAATTTGACAGGATTTCTTTCACCGGTTGACAATCATATGAGGAA
TCTAACAAGCCAAGACCTACTGTATGACCTTGACATAAATATATTTGATGAGATAAACT
TAATGTCAATTGGCCACAGAAGACAACCTTTGATCCAATCGATGTTTCTCAGCTTTTTTGAT
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CAAGTCTAATTCCTCTCACTCTGTGTGTGATGAAGGTGCTATAGGTTATTGCACTGACC
ATGAATCTAGTTCCCATCATGACTTAGAAGGTGCTGTAGGTGGCTACTACCCAGAACCC
AGTAAGCTTTGTCACTTGGATCAAAGTGATTCTGATTTCCATGGAGATCTTACATTTCA
ACACGTATTTTATAACCACACTTACCACTTACAGCCAACTGCACCAGAATCTACTTCTG
AACCTTTTCCGTGGCCTGGGAAGTCACAGAAGATAAGGAGTAGATACCTTGAAGACACA
GATAGAACTTGAGCCGTGATGAACAGCGTGCTAAAGCTTTGCATATCCCTTTTCTGT
AGATGAAATTGTCGGCATGCCTGTTGATTCTTTCAATAGCATGTTAAGTAGATATTATC
TGACAGACCTACAAGTCTCACTTATCCGTGACATCAGACGAAGAGGGAAAAATAAGTT
GCTGCGCAGAAGTGTGTAACGCAAATTGGACATAATTTTGAATTTAGAAGATGATGT
ATGTAAGTTGCAAGCAAAGAAGGAACTCTTAAGAGAGAGCAAGCACAAATGTAACAAAG
CTATTAACATAATGAAACAGAACTGCATGACCTTTTATCATGATATTTTTAGTAGATTA
AGAGATGACCAAGGTAGGCCAGTCAATCCCAACCACTATGCTCTCCAGTGTAACCATGA
TGGAAGTATCTTGATAGTACCCAAAGAACTGGTGGCCTCAGGCCACAAAAGGAAACCC
AAAAGGGAAAGAGAAAGTGAGAAAGAACTGAAGATGGACTCTATTATGTGAAGTAGTAA
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TTAAGTACTGCTACTTGAATAACTCAGTTAACGCTGTTTTGAAGCTTACATGGACAAAT
GTTTAGGACTTCAAGATCACACTTGTGGGCAATCTGGGGGAGCCACAACTTTTCATGAA
GTGCATTGTATACAAAATTCATAGTTATGTCCAAAGAATAGGTTAACATGAAAACCCAG
TAAGACTTTCCATCTTGGCAGCCATCCTTTTTTAAGAGTAAGTTGGTTACTTCAAAAAGA
GCAAACACTGGGGATCAAATTATTTTAAGAGGTATTTTCAAGTTTAAATGCAAATAGCC
TTATTTTTCATTTAGTTTGTAGCACTATAGTGAGCTTTTCAAACACTATTTTAATCTTT
ATATTTAACTTATAAATTTTGCTTTCTATGGAAATAAATTTTGTATTTGTATTAAAAA
AAAAAA

Figure 8. Nucleic acid sequence of ColoUp5 (SEQ ID NO: 9)

ATGAAGTTGGAGGTGTTTCGTCCCTCGCGCGGCCACGGGGACAAGCAGGGCAGTGACCT
GGAGGGCGCGGGCGGCAGCGACGCGCCGTCCCCGCTGTCGGCGGCGGGAGACGACTCCC
TGGGCTCAGATGGGGACTGCGCGGCCAAGCCGTCCGCGGGCGGCGGCCAGAGATACG
CAGGGCGACGGCGAACAGAGTGCGGGAGGCGGGCCGGGCGCGGAGGAGGCGATCCCCGC
AGCAGCTGCTGCAGCGGTGGTGGCGGAGGGCGCGGAGGCCGGGGCGGCGGGGCCAGGCG
CGGGCGGCGCGGGGAGCGGCGAGGGTGACCGCAGCAAGCCATATACGCGGCGGCCCAAG
CCCCCTACTCGTACATCGCGCTCATCGCCATGGCCATCCGCGACTCGGCGGGCGGGCG
CTTGACGCTGGCGGAGATCAACGAGTACCTCATGGGCAAGTTCCCCTTTTTTCGCGGCA
GCTACACGGGCTGGCGCAACTCCGTGCGCCACAACCTTTCGCTCAACGACTGCTTCGTC
AAGGTGCTGCGCGACCCCTCGCGGCCCTGGGGCAAGGACAACCTACTGGATGCTCAACCC
CAACAGCGAGTACACCTTCGCCGACGGGGTCTTCCGCCGCCGCCGCAAGCGCCTCAGCC
ACCGCGCGCCGGTCCCCGCGCCCGGGCTGCGGCCCCGAGGAGGCCCGGGCCTCCCCGCC
GCCCCGCCGCCCGCGCCCCGCCCGCCCGGCTCGCCCCGCATGCGCTCGCCCCGCCGCCA
GGAGGAGCGCGCCAGCCCCGCGGGCAAGTTCTCCAGCTCCTTCGCCATCGACAGCATCC
TGCGCAAGCCCTTCCGCAGCCGTGCGCTCAGGGACACGGCCCCCGGGACGACGCTTCAG
TGGGGCGCCGCGCCCTGCCCGCGCTGCCCGCGTTCCCCGCGCTCCTCCCCGCGGCGCC
CTGCAGGGCCCTGCTGCCGCTCTGCGCGTACGGCGCGGGCGAGCCGGCGCGGCTGGGCG
CGCGCGAGGCCGAGGTGCCACCGACCGCGCCGCCCTCCTGCTTGCACCTCTCCCGGCG
GCGGCCCCCGCCAAGCCACTCCGAGGCCCGGCGGCCGGCGGCGCGCACCTGTACTGCCC
CCTGCGGCTGCCCCGAGCCCTGCAGGCGGCCTTAGTCCGNCGTCCTGGCCCCGCACCTGT
CGTACCCGGTGGAGACGCTCCTAGCTTGA

Figure 9. Nucleic acid sequence of ColoUp6 (SEQ ID NO: 10)

GGCAGATGAAATATAAGATTCATCAACCACATTTGACAGCCCATGGCAGGTTTCCTGTT
TTCCATCGTCCCTCTGCAGGTCACAGACACACAGAGCCCAGCCGTGGCAGGCTCAGCCG
GGGTCCGGGGCTGCTAACAACGGCTACATTCTCCCCAGGGCCAAGGGAAATCCTGAG
CGCAGGCCAGGGTTGTTTGGTTTTGAGGTGTGCTGGGATGAAAGGCACCCTGGAAGTGG
AAGGTTCCGGTCATTCATTAATTAATTACATCTATAATTGAGGGTTTGTTCCTTAAGAGCG
AGTCCTTTGAAAGTACTTTTCCTTCAAACAGTGACTGCCACAAAGGCATCAGATATTCAC
CACCTTCTCGGCTGCCTCAGCACAGCAAGCTTTATTCTGGGACCTGAGATCCTGTTCTG
AGCTGGCTTTCCCTTCTCCAGGCTCGCTCACCTCCCTTTAGAGATAGTGGATGGTAAG
ATGACCAATGCTCAGATTATTCTTCTCATTGACAATGCCAGGATGGCAGTGGATGACTT
CAACCTCAAGAAATGGAGAAGCATCATGTGCCAAGTGACTTCAATGTCAATGTGAAGGT
GGATACAGGTCCCAGGGAAGATCTGATTAAGGTCCTGGAGGATATGAGACAAGAATATG
AGCTTATAATAAAGAAGAAGCATCGAGACTTGGACACTTGGTATAAAGAACAGTCTGCA
GCCATGTCCCAGGAGGCAGCCAGTCCAGCCACTGTGCAGAGCAGACAAGGTGACATCCA
CGAACTGAAGCGCACATTCCAGGCCCTGGAGATTGACCTGCAGGCACAGTACAGCACGA
AATCTGCTTTTGGAAAACATGTTATCCGAGACCCAGTCTCGGTACTCCTGCAAGCTCCAG
GACATGCAAGAGATCATCTCCCACTATGAGGAGGAACTGACGCAGCTACGCCACGAACT
GGAGCGGCAGAACAATGAATACCAAGTGCTGCTGGGCATCAAAACCCACCTGGAGAAGG
AAATCACACGTACCGACGGCTCCTGGAGGGAGAGAGTGAAGGGACACGGGAAGAATCA
AAGTCGAGCATGAAAGTGTCTGCAACTCCAAAGATCAAGGCCATAACCCAGGAGACCAT
CAACGGAAGATTAGTTCTTTGTCAAGTGAATGAAATCCAAAAGCACGCATGAGACCAAT
GAAAGTTTCCGCCTGTTGTAAATCTATTTTCCCCCAAGGAAAGTCCTTGCACAGACAC
CAGTGAGTGAGTTCTAAAAGATACCCTTGGGAATTATCAGACTCAGAACTTTTATTTTT
TTTTTCTGTAAACAGTCTCACCAGACTTCTCATAATGCTCTTAATATATTGCACTTTTCT
AATCAAAGTGCGAGTTTATGAGGGTAAAGCTCTACTTTCCTACTGCAGCCTTCAGATTC
TCATCATTTTGCATCTATTTTGTAGCCAATAAACTCCGCACTAGCAAAAAAAAAAAAA

Figure 10. Nucleic acid sequence of ColoUp7 (SEQ ID NO: 11)

TTTTTTTTTTAAAAAAGAGGCTTGGTAAGTTTTTGATGCTTAGTTGACTTTTAGCATT
ATCCAGCATTTGTATTATGAACCAGTGAGTACTGTAATTTTTCTTTCCCTTTCAGAAAG
ACTCAAAGGGAACATATAAATGTTTCCTATTTTAAATGTGGCAATAGTGTAGCTAACAC
TGGTACAGACGGAATAAACACACCTCTAATATTCTCCTGAAGATTTGGTGATCCAGTTT
CAAATAAGGTATGGGAAAAACAGATGTTTTATTATCGCCACTTAATCCTTACTTCCGA
TTATAATTATACATGTTTGGCTGTAATAACTATACTAAAGCATGCTTGTGAAAGTAGAC
TTCTACAAGGACAGAAAACCCACAACAACAAAGATCGATCACGAAAGACAAGGCATA

Figure 11. Nucleic acid sequence of ColoUp8 (SEQ ID NO: 12)

CTTTTCTTCCGCACGGTTGGAGGAGGTCGGCTGGTTATCGGGAGTTGGAGGGCTGAGGT
CGGGAGGGTGGTGTGTACAGAGCTCTAGGACTCACGCACCAGGCCAGTCGCGGATTTTG
GGCCGAGGCCTGGGTTACAAGCAGCAAGTGCGCGGTTGGGGCCACTGCGAGGCCGTTTT
AGAAAACCTGTTTAAAACAAAGAGCAATTGATGGATAAATCAGGAATAGATTCTCTTGAC
CATGTGACATCTGATGCTGTGGAACCTTGCAAATCGAAGTGATAACTCTTCTGATAGCAG
CTTATTTTAAAACCTCAGTGTATCCCTTACTCACCTAAAGGGGAGAAAAGAAACCCCATTC
GAAAATTTGTTTCGTACACCTGAAAGTGTTACGCAAGTGATTCAAGTGACTCATCT
TTTGAACCAATACCATTGACTATAAAAGCTATTTTTTGAAGATTCAAGAACAGGAAAAA
GAGATATAAAAAAAGAAAAAGAGGAGGTACCAGCCAACAGGAAGACCACGGGGAAGAC
CAGAAGGAAGGAGAAATCCTATATACTCACTAATAGATAAGAAGAAACAATTTAGAAGC
AGAGGATCTGGCTTCCCATTTTTTAGAATCAGAGAATGAAAAAACGCACCTTGGAGAAA
AATTTTAACGTTTGAGCAAGCTGTTGCAAGAGGATTTTTTAACTATATTGAAAAGCTGA
AGTATGAACACCACCTGAAAGAATCATTGAAGCAAATGAATGTTGGTGAAGATTTAGAA
AATGAAGATTTTGACAGTCGTAGATACAAATTTTTTGGATGATGATGGATCCATTTCTCC
TATTGAGGAGTCAACAGCAGAGGATGAGGATGCAACACATCTTGAAGATAACGAATGTG
ATATCAAATTTGGCAGGGGATAGTTTTCATAGTAAGTTCTGAATTCCCTGTAAGACTGAGT
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GTAAATTGGTTGAAGAAATTAGATCCCAAAGATTCTTGGTGAATTTTGAAGTCTTCATC
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AATGCAGTTTCTCATTTGCTGTGGACATGACCATAAAAAAAATTTCCAGTAGGTTTTT
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AAAATTTCTCCTAGATCTCTTGAATCATGCAAATTTGCTTTGCCTTTATATTGTAACCTT
TGTGGGTTGCTAATAACCAAGCAGTTTGTAGTAGAGTTAACTCAGGCTCGTTCTAGGGA
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ATGTGAGAGTTTTAAAGGTTAATCAAATTTCTCTTCTTCAGGGCAAACCTTGAAGATAA
ATCTTTTGACTCCAGCTCTTTAGAGGATCTAAAGTGACCTTGATGGACAGTGGAAGAAA
TCACAACATGGAATTCCTCGAATAACAATTTATTGACTTTAAATAATTTTGTCTAATGC
TACATATACACAATTAAAAACCTTTACACTATTTCTAGAAAGTCAGCATGTATTTTTG
GCTCGAAGTTTCTCTAGTGTTTTCTGTGGAAGGAATAAAAAATTTGAGTTTCAAAAAAAA
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA

Figure 12. Amino acid sequence of full-length ColoUp1 protein (SEQ ID NO: 13)

MGAAGRQDFLFKAMLTISWLTLTCTCPGATSTVAAGCPDQSPQLPWNPGHDQDHHVHIG
QGKTLTLLTSSATVYSIHISEGGKLVIKDHDEPIVLRTRHILIDNGGELHAGSALCPFQG
NFTIILYGRADEGIQPDPIYGLKYIGVGKGALELHGQKKLSWTFNLKTLHPGGMAEGG
YFFERSWGHARGVIVHVIDPKSGTVIHSRFDITYRSKKESERLVQYLNAVDPGRILSVAV
NDEGSRNLDDMARKAMTKLGSKHFLHLGFRHPWSFLTVKGNPSSSVEDHIEYHGHRGSA
AARVFKLFQTEHGEYFNVSLSSEWVQDVEWTEWFDHDKVSQTKGGEKISDLWKAHPGKI
CNRPIDIQATTMDGVNLSTEVVYKKGQDYRFACYDRGRACRSYRVRFLCGKPVPRPKLTV
TIDTNVNSTILNLEDNVQSWKPGDTLVIASDTDSMYQAEFFQVLPSCRSCAPNQVKVAGK
PMYLHIGEEIDGVDMRAEVGLLSRNIIVMGEMEDKCYPYRNHICNFFDFDTFGGHIKFA
LGFKAAHLEGTELKHMGGQLVGQYPIHFHLAGDVDERGGYDPPTYIRDLSIHHTFSSRCV
TVHGSGNLLIKDVVGYNLSLGHCFETEDGPEERNTFDHCLGLLVKSGTLLPSDRDSKMCK
MITEDSYPGYIPKPRQDCNAVSTFWMANPNNNLINCAAAGSEETGFWFIFHHVPTGPSV
GMYSPPGYSEHIFLGKFYNNRAHSNYRAGMIIDNGVKTTEASAKDKRPFLSIISARYSPH
QDADPLKPREPAIIRHFIAYKNQDHGAWLRGGDVWLDSCRADNGIGLTLASGGTFFPYD
DGSKQEIKNSLFVGESGNVGTEMMDNRIWGPGLDHSGRTPIGQNFPPIRGIQLYDGPI
NIQNCTFRKFVALEGRHTSALAFLNNAWQSCPHNNVTGIAFEDVPITSRVFFGEPGPW
FNQLDMDGDKTSVFHDVDGSVSEYPGSYLTKNDNWLVRHPDCINVPDWRGAICSGCYAQ
MYIQAYKTSNLRMKIINKDFPSHPLYLEGALTRSTHYQQYQPVVTLQKGYTIHWDQTAP
AELAIWLINFNKGDWIRVGLCYPRGTTFSILSDVHNRLKQTSKTGVFVRTLQMDKVEQ
SYPGRSHYYWDEDSGLLFLKLKAQNEREKFAFCSMKGCERIKIKALIPKNAGVSDCTAT
AYPKFTERAVVDVPMPKKLFGSQLKTKDHFLEVKMESKQHFHFWLWDFAYIEVDGKKY
PSSDGIQVVVIDGNQGRVVSHTSFRNSILQGIWQLFNIVATIPDNSIVLMASKGRYV
SRGPWTRVLEKLGA DRGLKLKEQMAFVGFKGSFRPIWVTLDTEDHKAKIFQVVPIPVVK
KKKL

Figure 13. Amino acid sequence of full-length ColoUp2 protein (SEQ ID NO: 14)

MPPFLLLEAVCVFLFSRVPPSLPLQEVHVSKETIGKISAASKMMWCSAAVDIMFLLDGS
NSVGKGSFERSKHFAITVCDGLDISPERVRVGAFQFSSTPHLEFPLDSFSTQQEVKARI
KRMVFKGGRTETELALKYLLHRGLPGGRNASVPQILIIVTDGKSQGDVALPSKQLKERG
VTVFAVGVRFPWEELHALASEPRGQHVLLAEQVEDATNGLFSTLSSSAICSSATPDCR
VEAHPCEHRTLEMVREFAGNAPCWGRSRRTLAVLAAHCPFYSWKRVFLTHPATCYRTTC
PGPCDSQPCQNGGTCVPEGLDGYQCLCPLAFGGEANCALKLSLECRVDLLFLLDSSAGT
TLDGFLRAKV FVKRFVRAVLSEDSRARVGVATYSRELLVAVPVGEYQDVPDLVWSLDGI
PFRGGPTLTGSALRQAAERGFGSATRTGQDRPRRVVLLTESHSEDEVAGPARHARARE
LLLLGVGSEAVRAELEEEITGSPKHVMVYSDPQDLFNQIPELQGKLCSRQRP GCRTQALD
LVFMLDTSASVGPENFAQM QS FVRSCALQFEVNP DVTQVGLVVYGSQVQTAFGLDTKPT
RAAMLRAISQAPYLGGVGSAGTALLHIYDKVMTVQRGARPGV PKAVVLTGGRGAEDAA
VPAQKL RNNGISVLVVGVPVLSEGLRRLAGPRDSL IHVAAYADLRYHQDV LIEWLCGE
AKQPVNLCKPSPCMNEGSCVLQNGSYRCKCRD GWEGPHCENRFLRRP

Figure 14. Amino acid sequence of full-length Osteopontin protein (SEQ ID NO: 15)

MRIAVICFLLGITCAIPVKQADSGSSEEKQLYNKYPDAVATWLNPDPSQKQNLLAPQT
LPSKSNESHDMDDMDEDDDDHVDSQDSIDSNDSDDVDDTDDSHQSDSHHSDSEDEL
VTDFPTDLPATEVFTPVPVPTVDITYDGRGDSVVYGLRSKSKKFRPDIQYPDATDEDITS
HMESEELNGAYKAIPVAQDLNAPSDWDSRGKDSYETSQLDDQSAETHSHKQSRLYKRKA
NDESNEHSDVIDSQELSKVSREFHSHEFHSHEDMLVVDPKSKEEDKHLKFRISHELDSA
SSEVN

Figure 15. Amino acid sequence of full-length ColoUp3 protein (SEQ ID NO: 16)

MGLPRGPLASLLLLQVCWLQCAASEPCRAVFREA EVTLEAGGAEQEPGQALGKVFMGCP
GQEPALFSTDND DFTVRNGETVQERRSLKERNPLKIFPSKRILRRHKRDWV VAPISVPE
NGKGPFPQRLNQLKSNKDRDTKIFYSITGPGADSPPEGVFAVEKETGWLLL NKPLDREE
IAKYELFGHAVSENGASVEDPMNISII VTDQNDHKPKFTQDTFRGSVLEGVLPGT SVMQ
VTATDEDDAIYTYNGVVAYS IHSQEPKDPHDL MFTIHRSTGTISVISSGLDREKVPEYT
LTIQATDMDGDGSTTTAVAVVEILDANDNAPMFD PQKYEAHVPENAVGHEVQRLTVTDL
DAPNSPAWRATY LIMGGDDGDHFTITTHPESNQGIL TTRKGLDFEAKNQHTLYVEVTNE
APFVLKLPTSTATIVVHVEDVNEAPVFVPPSKVVEVQEGIPTGEPVCVYTAEDPDKENQ
KISYRILRDPAGWLAMD PDSGQVTAVGTL DREDEQFVRNNIYEVMLAMDNGSPPTTGT
GTLLLT LIDVNDHGPVPEPRQITICNQSPVRQVLNITDKDLS PHTSPFQAQLTDDSDIY
WTAEVNEEGDTVVL SLKKFLKQD TYDVHLSLS DHGNEQLTVIRATVCDCHGHVETCPG
PWKGGF ILPVLGAVLALLFLLL VLLLLVRKKRKIKEPLLL PEDDTRDNV FYYGEEGGGE
EDQDYDITQLHRGLEARPEVVL RNDVAPTIIPTMYRPRPANPDEIGNFIIENLKAANT
DPTAPPYDTLLVFDYEGSGSDAASLSSLTSSASDQDQDYDYLNEWGSRFKKLADMYGGG
EDD

Figure 16. Amino acid sequence of full-length ColoUp4 protein (SEQ ID NO: 17)

MKHLKRWSAGGGLLHLTLLLSLAGLRVDLDLYLLLPPPTLLQDELLFLGGPASSAYAL
SPFSASGGWGRAGHLHPKGRELDPAAPPEGQLLREVRALGVFPVPRTSVDALVHSVAA
GSADEAHGLLGAAAASSTGGAGASVDGGSQAVQGGGDPRAARSGPLDAGEEEKAPAEP
TAQVPDAGGCASEENGVLREKHEAVDHSSQHEENEERVSAQKENSLLQNDNDDENKIAEK
PDWEAEKTTESRNERHLNGTDTFSLEDLFQLLSSQPENSLEGISLGDIPLPGSISDGM
NSSAHYHVNFSQAISQDVNLHEAILLCPNNTFRDPTARTSQSQEPFLQLNSHTTNPEQ
TLPGTNLTGFLSPVDNHRNLTSQDLLYDLIDINIFDEINLMSLATEDNFDPIDVSQFLD
EPDSDSGLSLDSSHNTSVIKSNSSHVCDEGAIGYCTDHESSSHHDLEGAVGGYYPEP
SKLCHLDQSDSDFHGDITFQHVFNHTYHLQPTAPESTSEFPWPFGKSQKIRSRYLEDT
DRNLSRDEQRAKALHIPFSVDEIVGMPVDSFNSMLSRYLLTDLQVSLIRDIRRGKKNV
AAQNCRKRLDIILNLEDDVCNLQAKKETLKRQAQCNKAINIMKQKLHDLYHDI FSRL
RDDQGRPVNPNHYALQCTHDGSILIVPKELVASGHKKETQKGKRK

Figure 17. Amino acid sequence of full-length ColoUp5 protein (SEQ ID NO: 18)

MKLEVFVPRAAHGDKQGS DLEGAGGSDAPSPLSAAGDDSLGSDGDCAAKPSAGGGARDT
QGDGEQSAGGGPGAEEAIPAAAAA VVAEGAEAGAAGPGAGGAGSGEGARSKPYTRRPK
PPYSYIALIAMAIRDSAGGRLTLAEINEYLMGKFPFFRGSYTGWRNSVRHNLSLND CFV
KVL RDPSRPWGKDNYWMLNPNSEYTFADGVFRRRRKRLSHRAPVPAPGLRPEEAPGLPA
APPPAPAAPASPRMRSPARQEERASPAGKFSSSF AID SILRKPFRRRLRDTAPGTTLQ
WGAAPCPPLPAFPALLPAAPCRALLPLCAYGAGEPARLGAREAEVPPTAPPLLLAPLPA
AAPAKPLRGPAAGGAHLYCPLRLPAALQAALVRRPGPHLSYPVETLLA

Figure 18. Amino acid sequence of full-length ColoUp6 protein (SEQ ID NO: 19)

MEKHHVPSDFNVNVKVDTPREDLIKVLEDMRQEYELIIKKKHRDLDTWYKEQSAAMSQ
EAASPATVQSRQGDIELKRTFQALEIDLQAQYSTKSALENMLSETQSRYSCKLQDMQE
IISHYEEELTQLRHELERQNNYQVLLGIKTHLEKEITTYRRLLEGESEGTREESKSSM
KVSATPKIKAITQETINGRLVLCQVNEIQKHA

Figure 19. Amino acid sequence of full-length ColoUp8 protein (SEQ ID NO: 20)

MDKSGIDSLDHVTSDAVELANRSDNSSDSSLFKTQCIPIYSPKGEKRNPIRKFVRTPEV
HASDSSSDSSFEPITIKAIERFKNRKKRYKKKKKRRYQPTGRPRGRPEGRNPIYS
LIDKKKQFRSRGSGFPFLESENEKNAPWRKILTFEQAVARGFFNYIEKLKYEHLKESL
KQMNVGEDLENEFDSSRYKFLDDGSIPIEESTAEDEDATHLEDNECDIKLAGDSFI
VSSEFPVRLSVYLEEEDITEEAALSKKRATKAKNTGQRGLKM

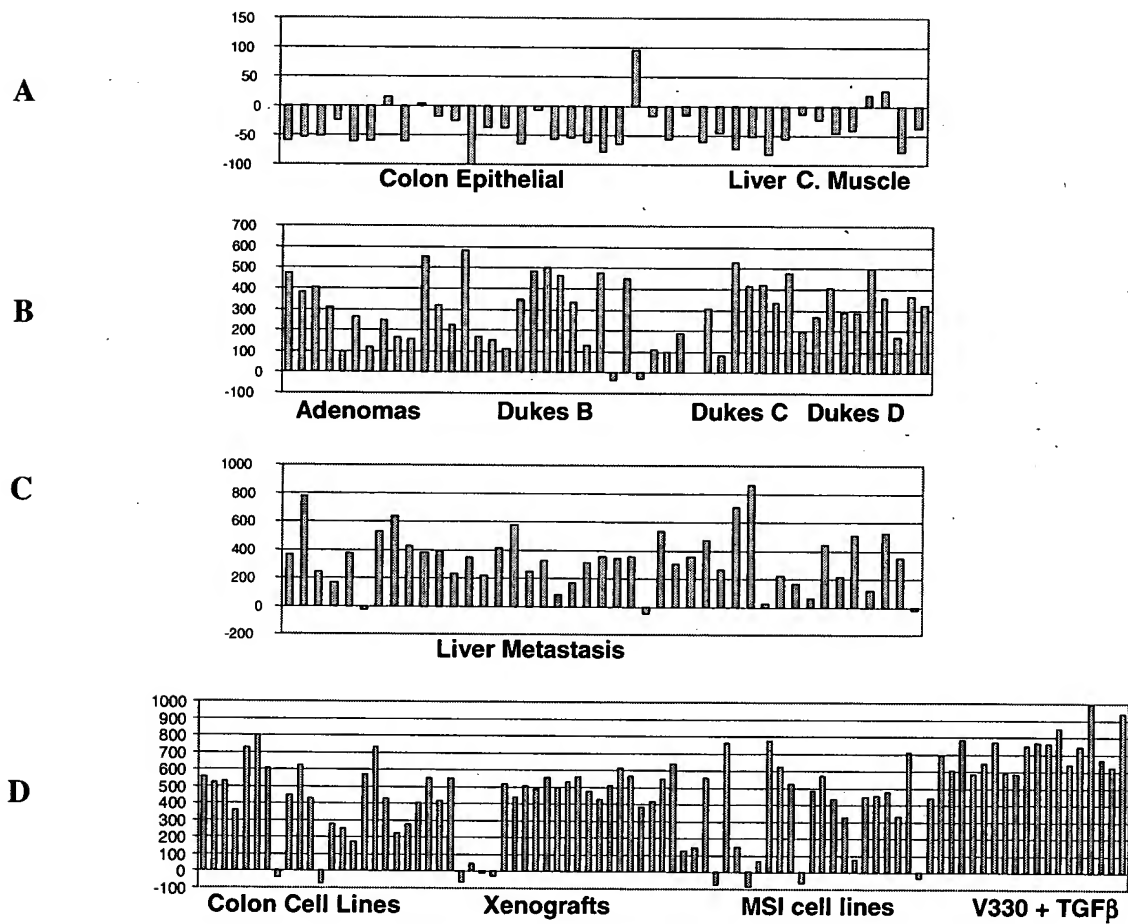


Figure 20

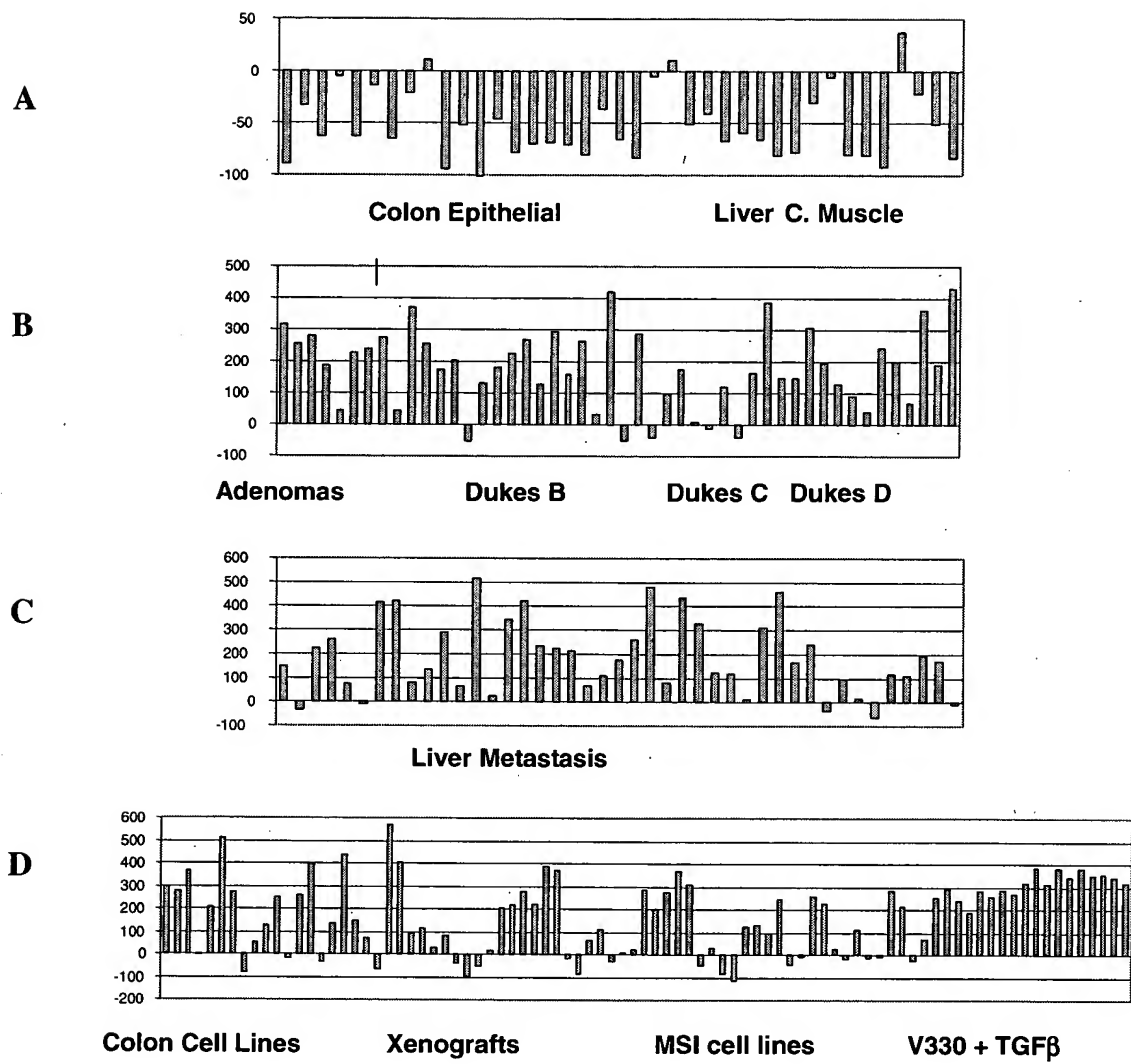


Figure 21

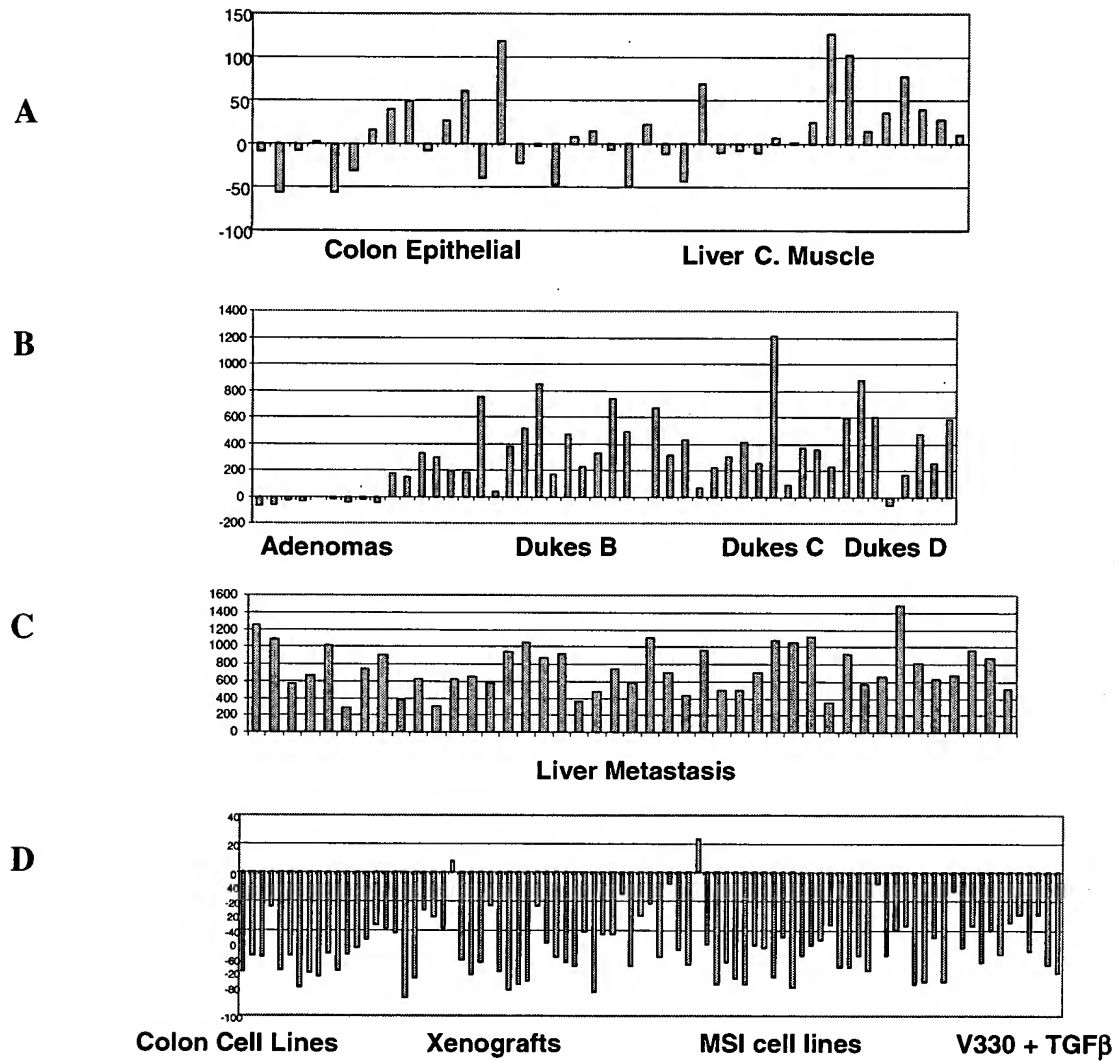


Figure 22

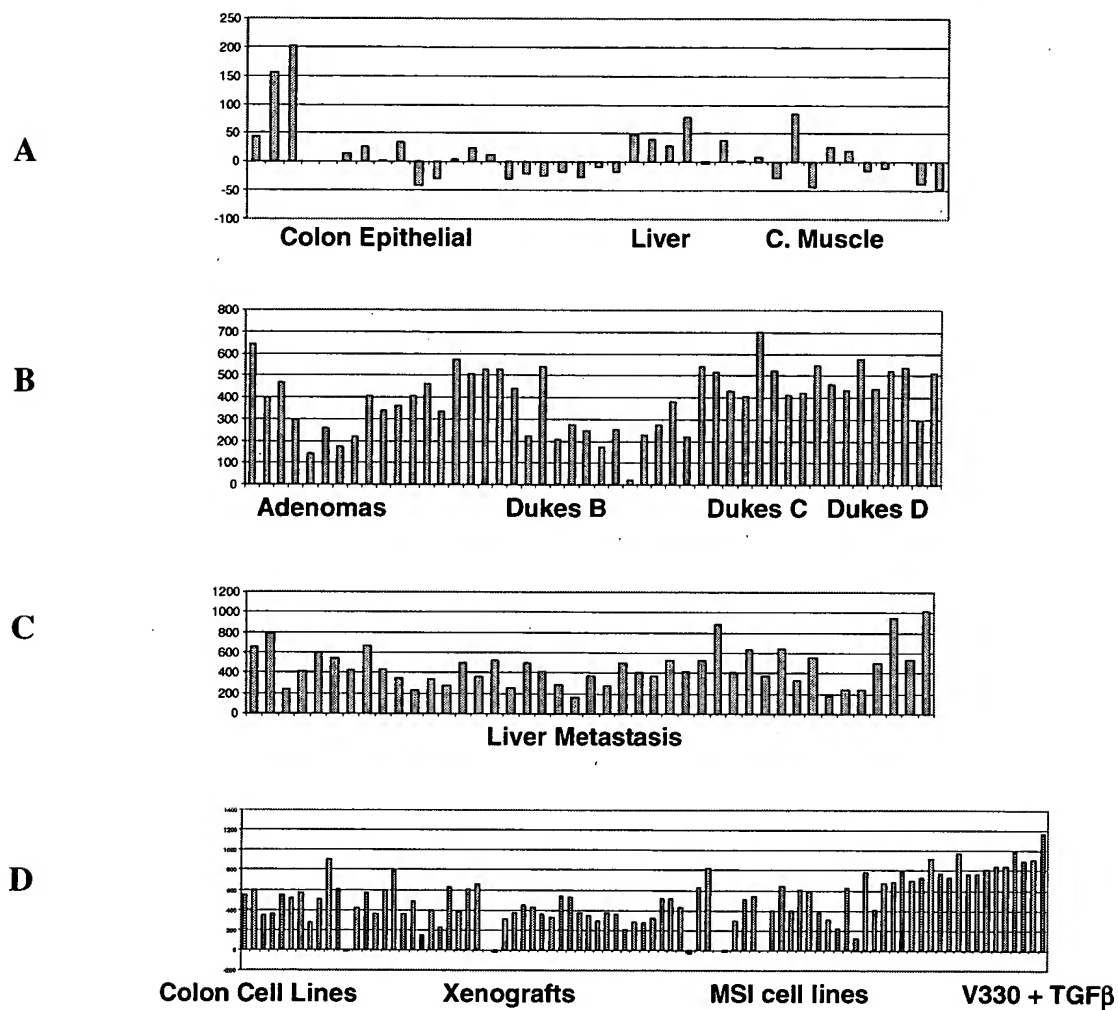


Figure 23

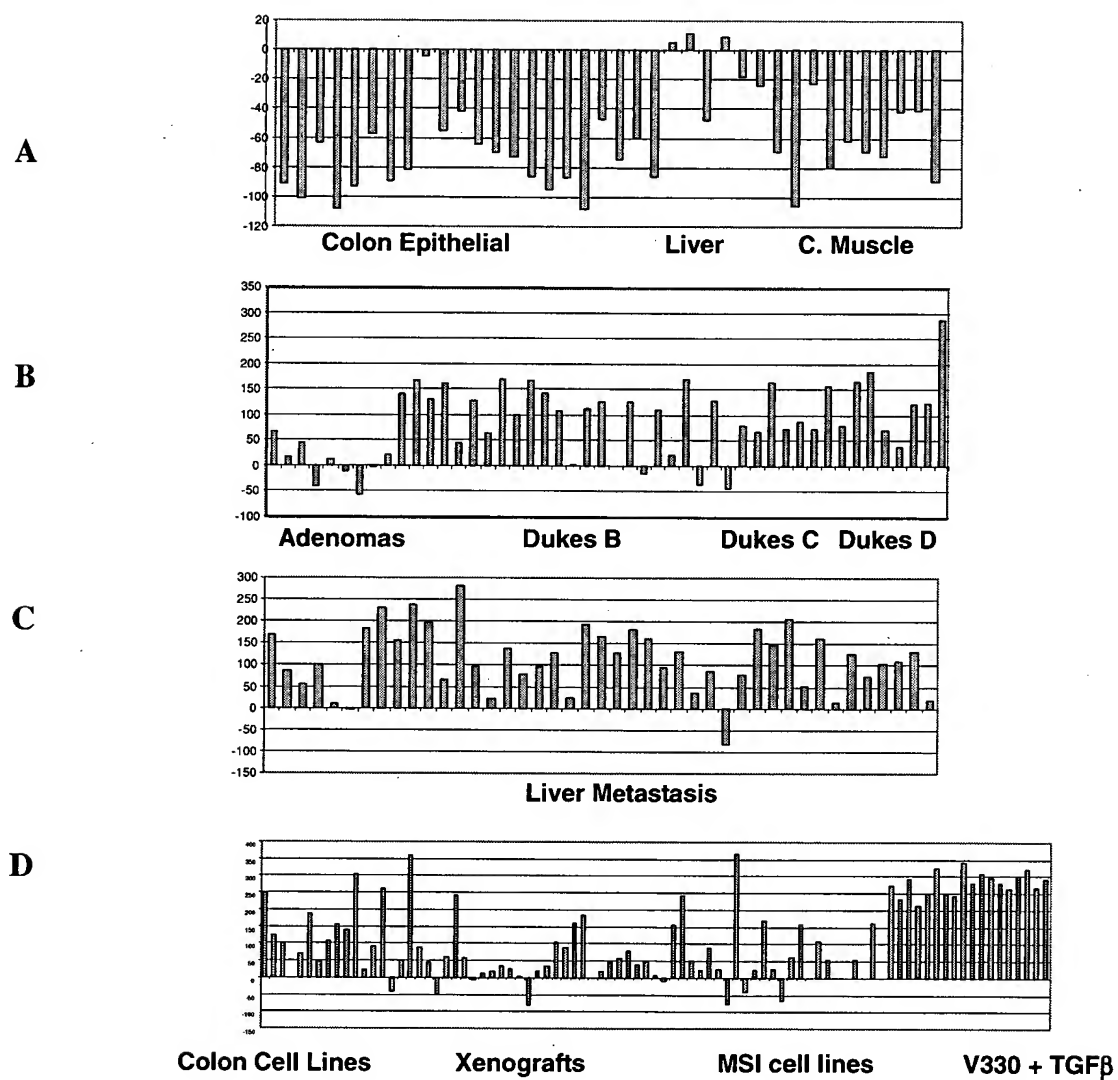


Figure 24

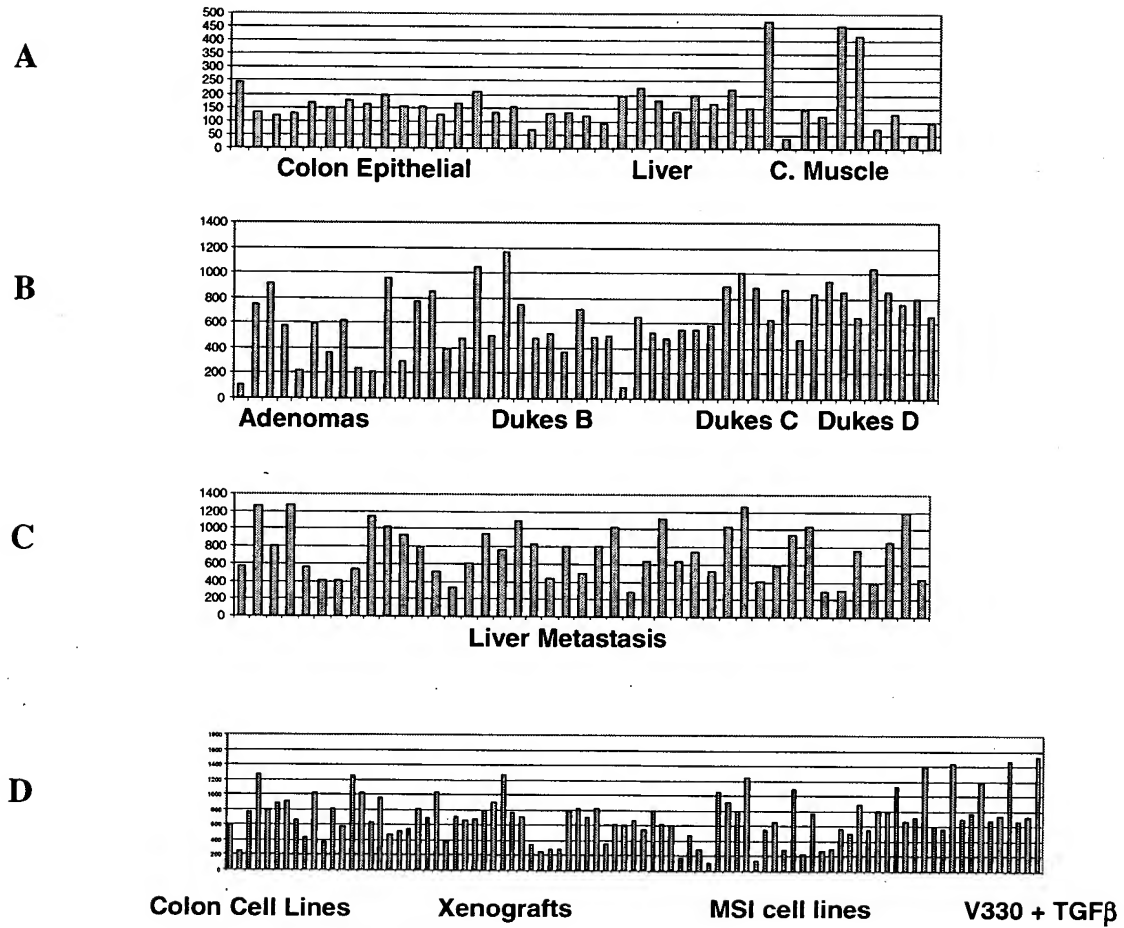


Figure 25

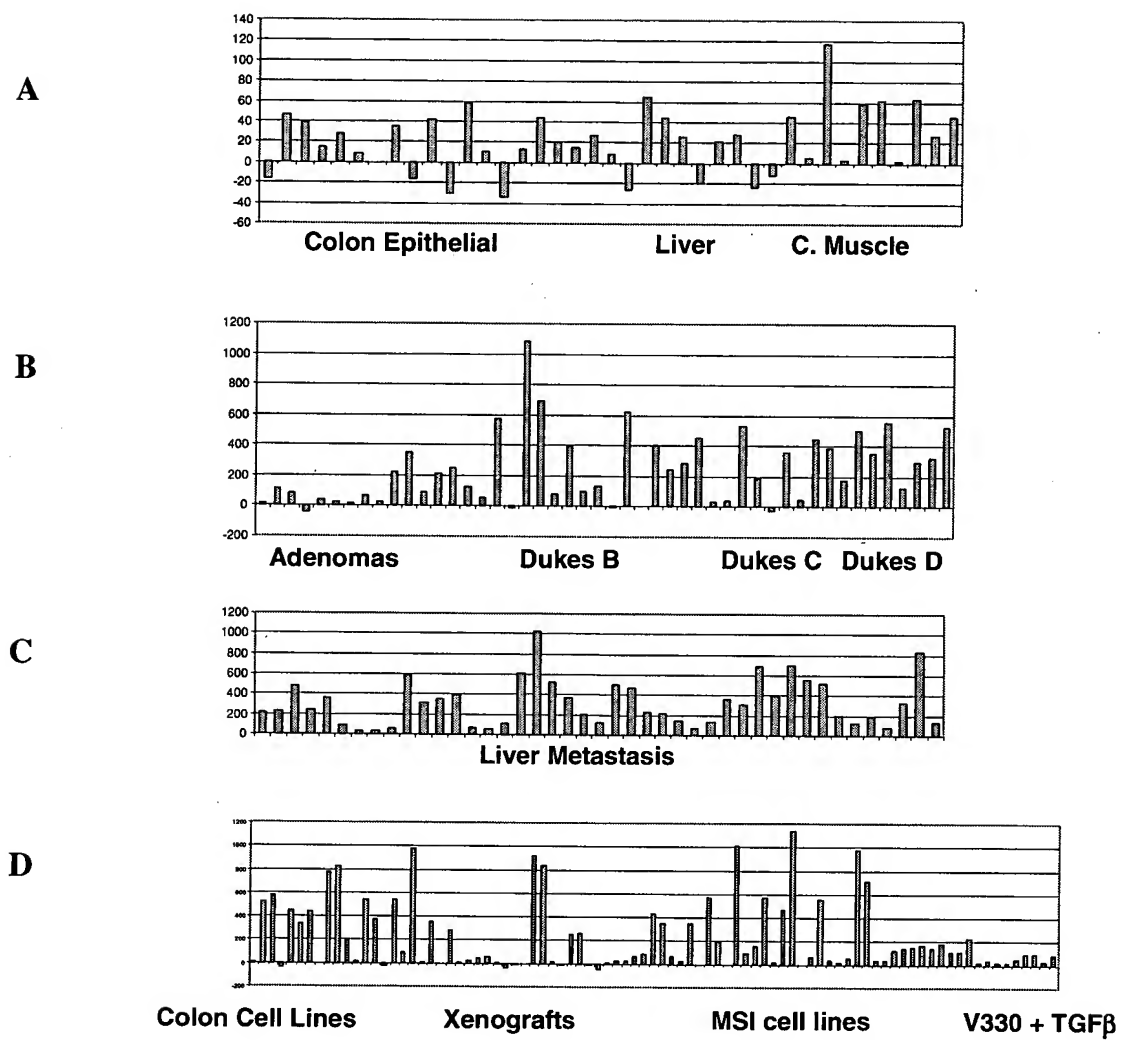


Figure 26

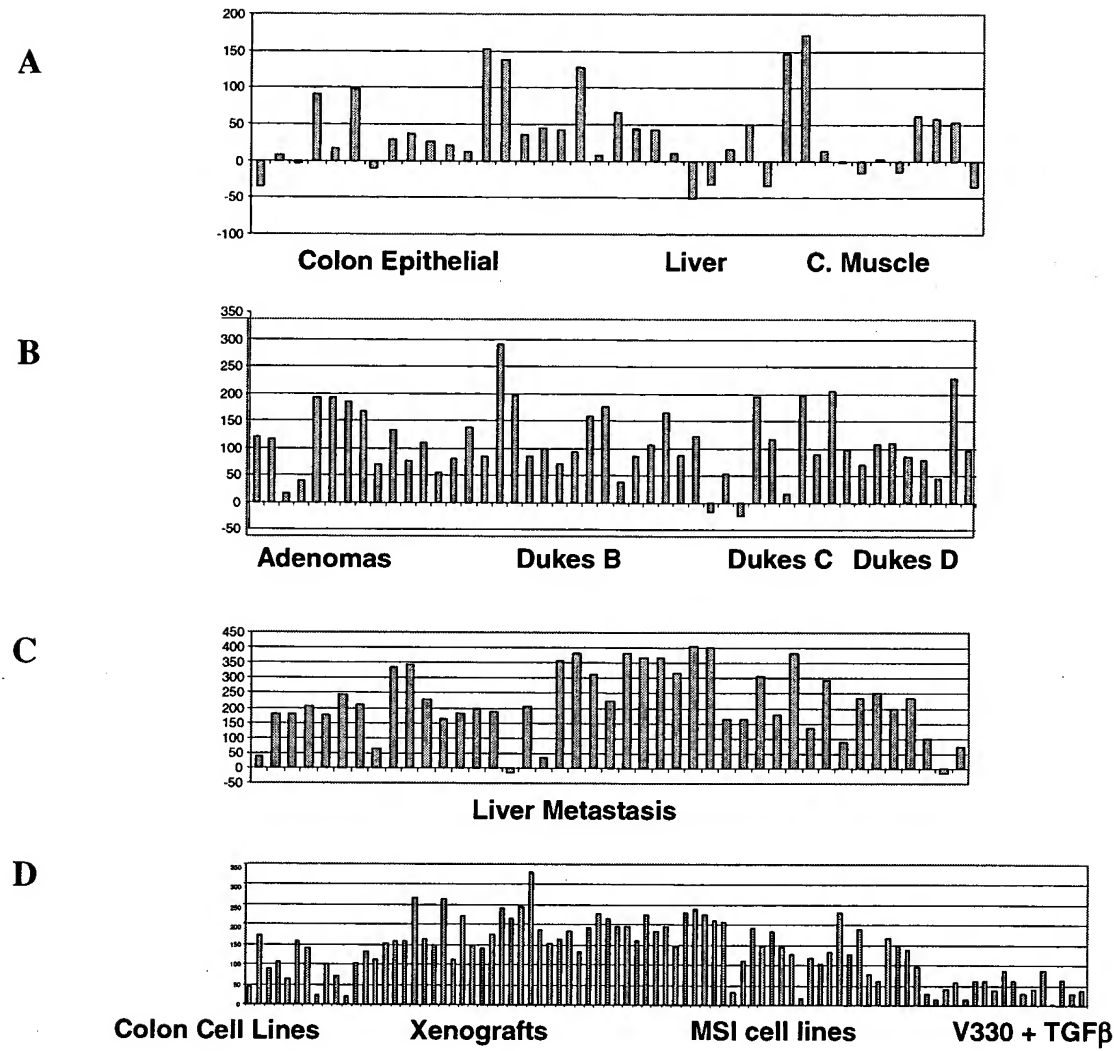


Figure 27

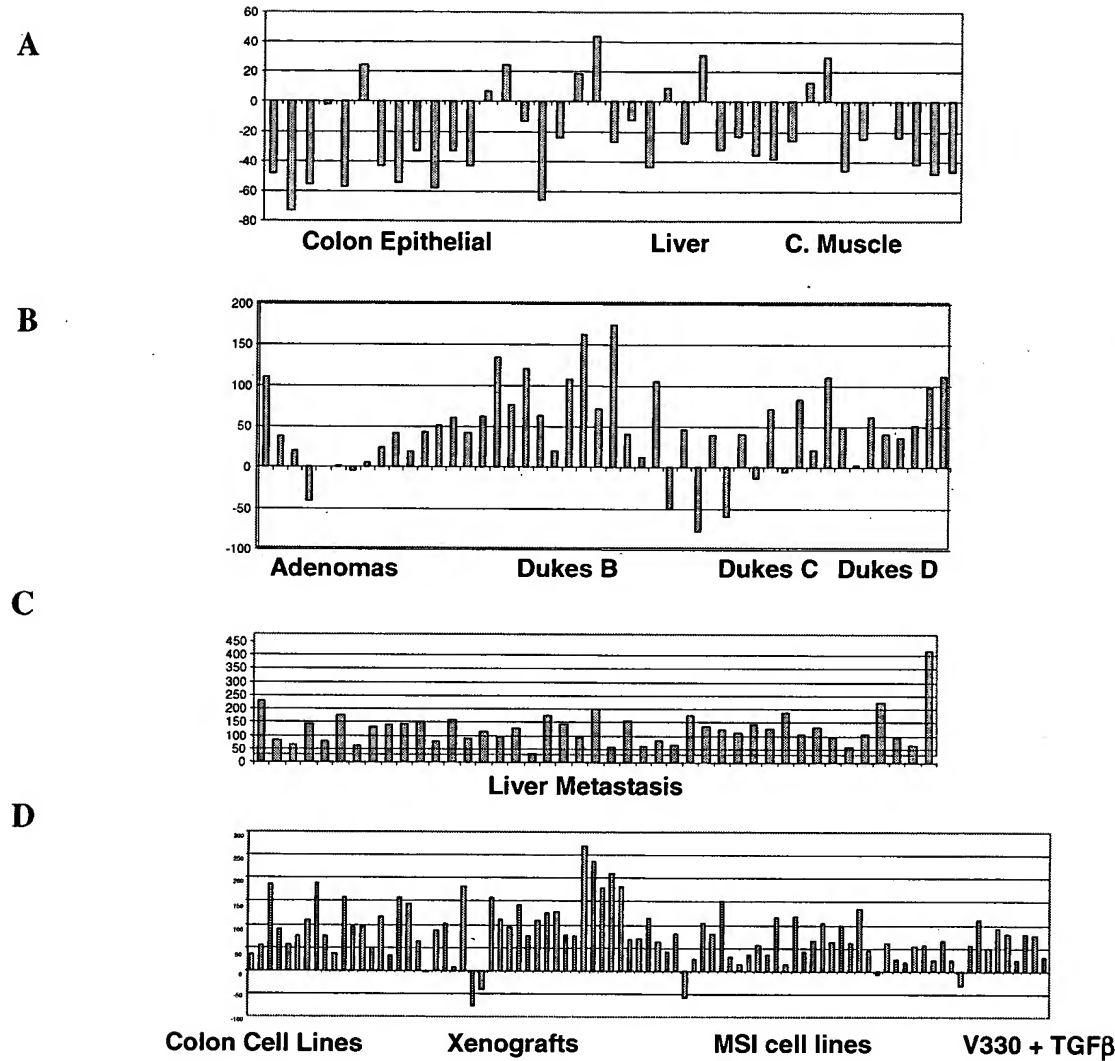


Figure 28

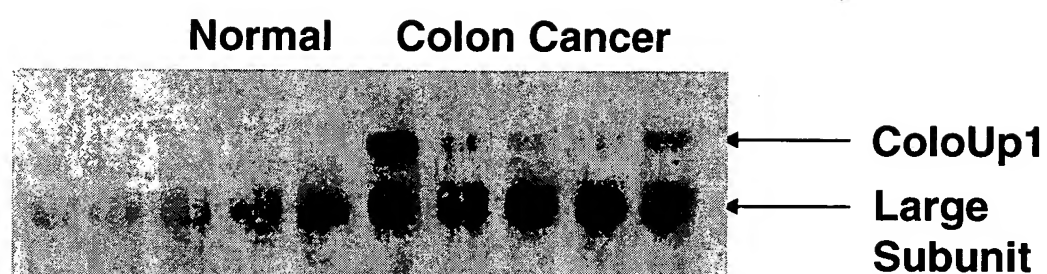


Figure 29A

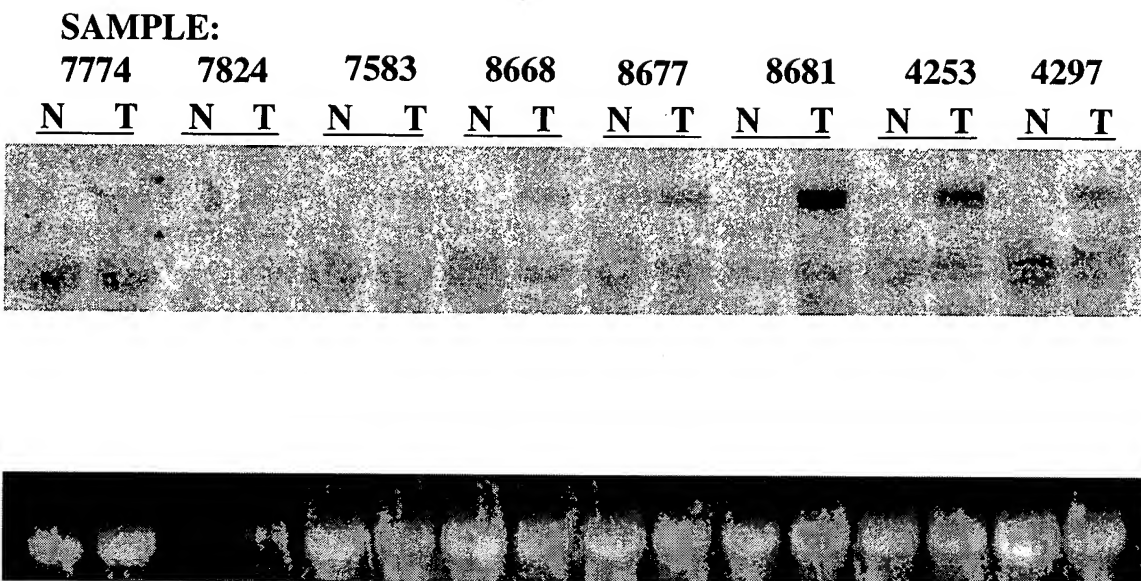


Figure 29B

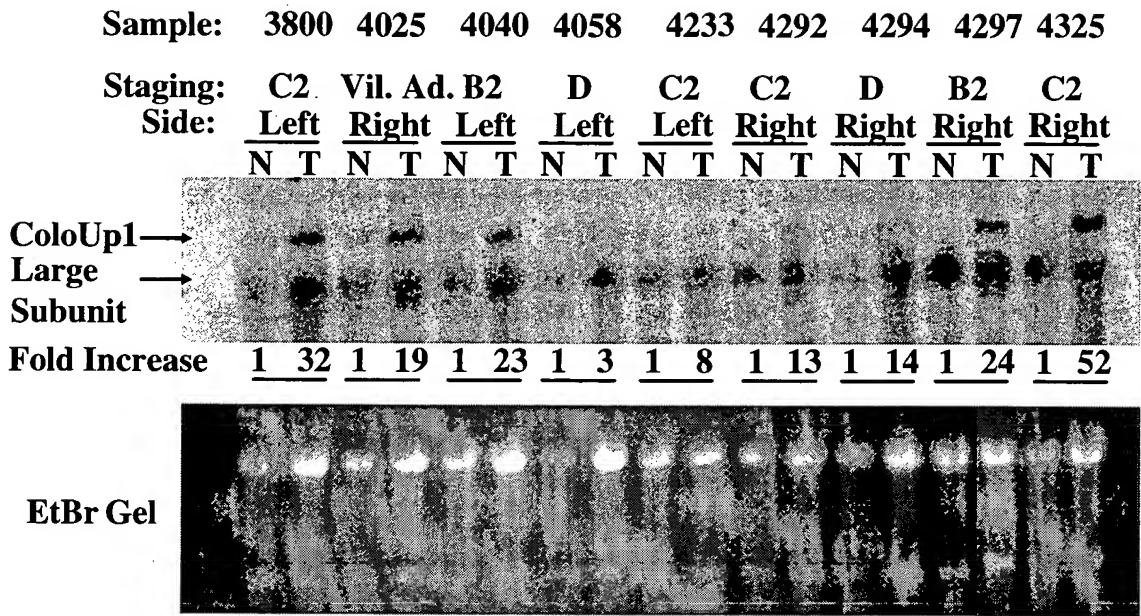


Figure 29C

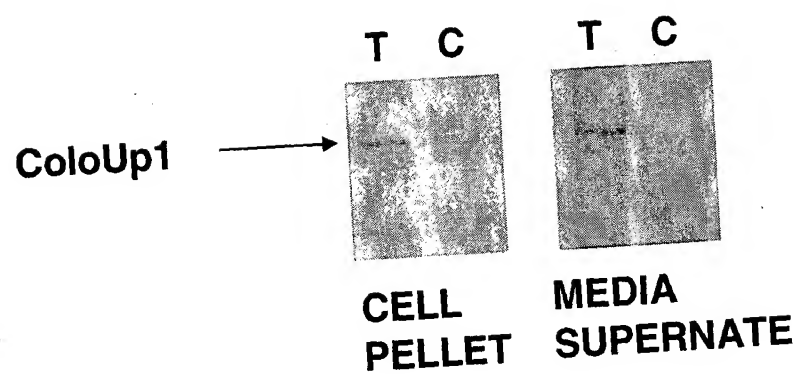


Figure 30A

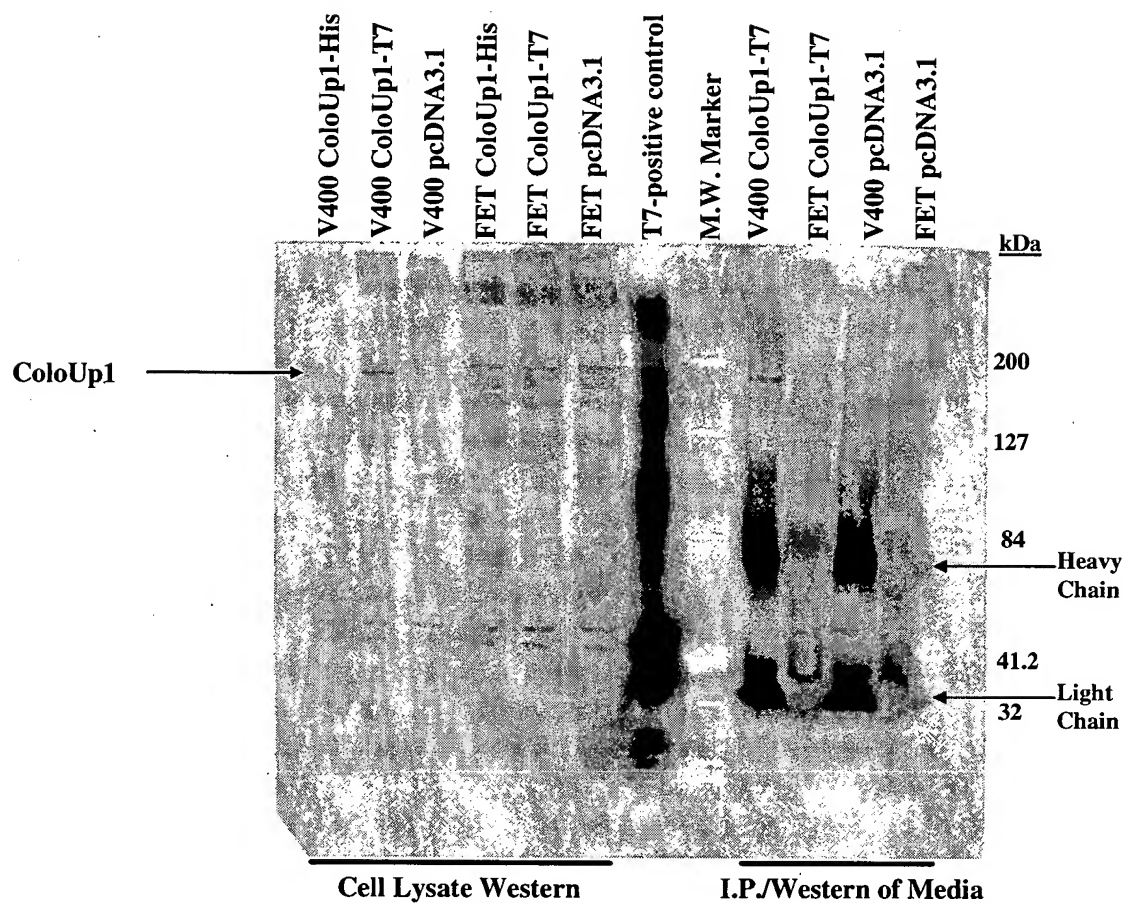


Figure 30B

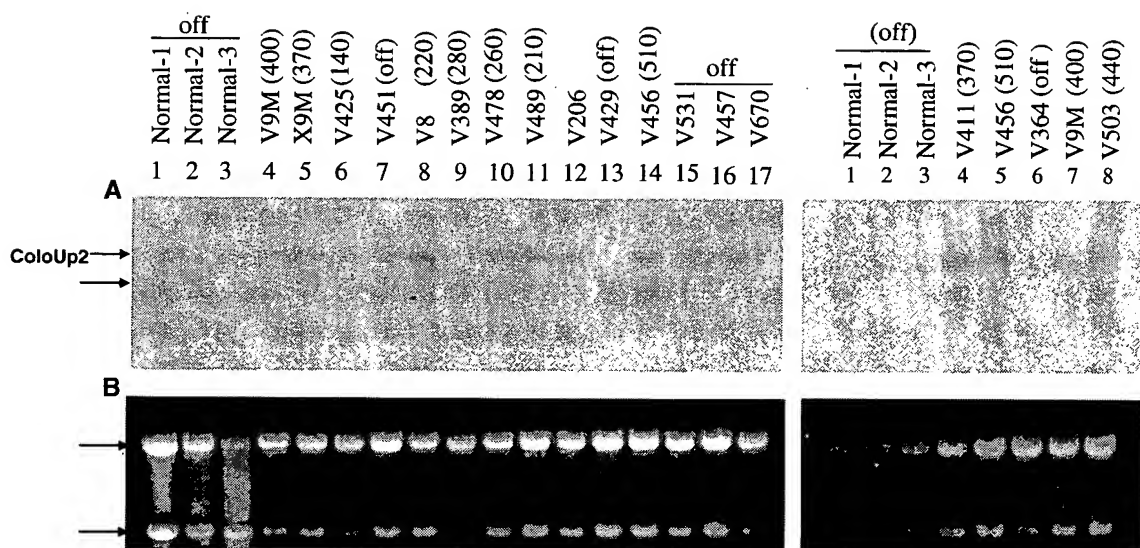


Figure 31

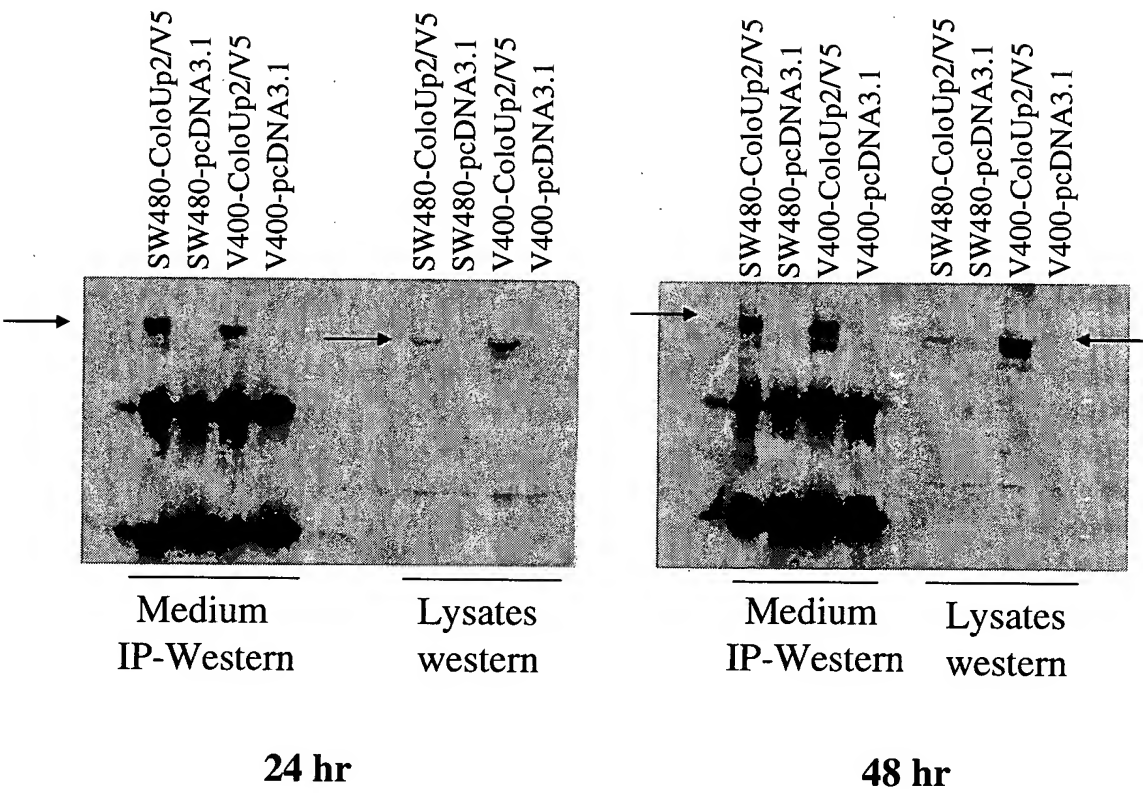


Figure 32

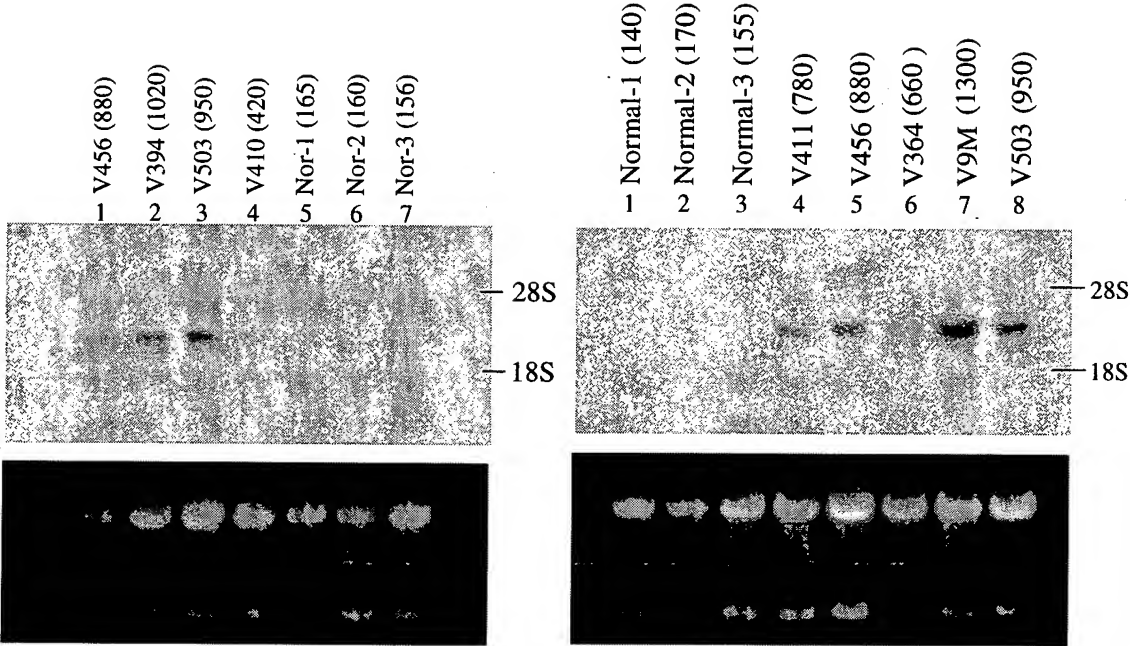


Figure 33

human foxq1 120	P P Y S Y I A L I A M A I R D S A G G R E T L A E I N E Y L M G K F P F F R G S Y T G W R N S V R H N L S L N D G F V K	179
mouse foxq1 116	P P Y S Y I A L I A M A I R D S A G G R E T L A E I N E Y L M G K F P F F R G S Y T G W R N S V R H N L S L N D G F V K	175
rat foxq1 116	P P Y S Y I A L I A M A I R D S A G G R I T L A E I N E Y L M G K P F F R G S Y T G W R N S V R H N L S L N D G F V K	175

human foxq1 180	VLRDLS	SRP	WGK	DDNY	WML	NPN	SE	YTF	A	D	G	V	E	R	R	R	R	K	R	L	S	H	R	A	P	V	P	A	P	P	A	P	239																							
mouse foxq1 176	VLRDPS	SRP	WGK	DDNY	WML	NPN	SE	YTF	A	D	G	V	E	R	R	R	R	K	R	L	S	H	R	T	V	S	A	S	G	L	R	P	E	E	A	P	P	235																		
rat foxq1 176	VLRDPS	SRP	WGK	DDNY	WML	NPN	SE	YTF	A	D	G	V	E	R	R	R	R	K	R	L	S	H	R	T	V	S	A	S	G	L	R	P	E	E	A	P	P	235																		
human foxq1 240	P	P	A	P	A	P	A	S	P	R	M	R	S	P	A	R	O	E	R	A	S	P	A	G	K	E	S	S	F	A	I	D	S	I	L	R	K	P	F	R	S	R	L	R	D	T	A	P	G	T	T	L	Q	W	G	298
mouse foxq1 236	P	P	A	P	A	P	A	S	P	R	M	R	S	P	A	R	O	E	R	S	P	A	S	K	E	S	S	F	A	I	D	S	I	L	S	K	P	F	R	S	R	R	D	G	S	A	D	G	V	O	L	P	W	G	295	
rat foxq1 236	P	P	A	P	A	P	A	S	P	R	M	R	S	P	A	R	O	E	R	S	P	A	S	K	E	S	S	F	A	I	D	S	I	L	S	K	P	F	R	S	R	R	D	G	S	A	D	G	V	O	L	P	W	G	295	

human foxq1 299	A A P G P P L P A F P A L E P A A P C R A V D P L G A Y G A G E P A R L G A R E A E V P P P T A A P	L L I A P L P A A A P	358
mouse foxq1 296	A A P G P P L K A V P A L T P A A P G G A L L P L C A Y G A S E P T L L A S R G T E V Q P A A P	L L I A P L S T A A P	354
rat foxq1 296	A A P G P P L R A V P A L L P A S S G G A L L P L C A Y G A G E P T L L A S R G A E V Q P A A P	L L I A P L S T A A P	354

human foxq1 359 A K P L R G P - A A G C G A H L Y C P L R T P A A L O A A S V R R P G P H L P Y P V E T L L A 4033
mouse foxq1 355 A K P F R G P E T A G A A H L Y C P L R P T A L O A A A C C G P G P H L S Y P V E T L L A 4000
rat foxq1 355 A K P F R G P E T A G A A H L Y C P L R P T A L O A A A A C C G R G P H L S Y R V E T L L A 4000

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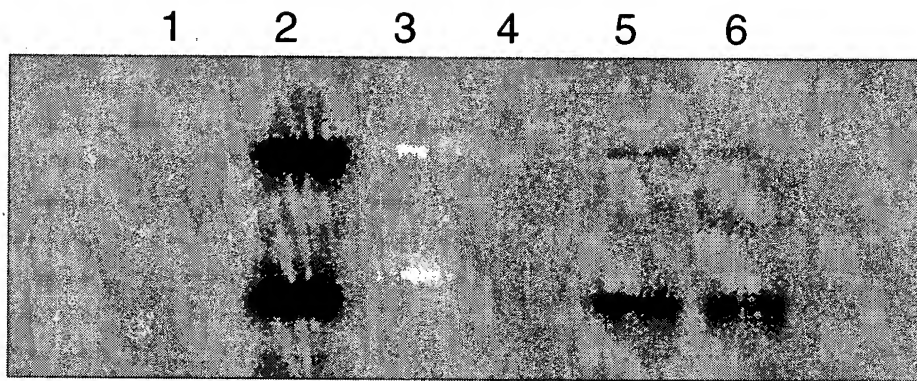


Figure 36

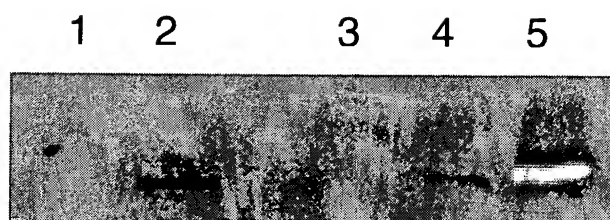


Figure 37

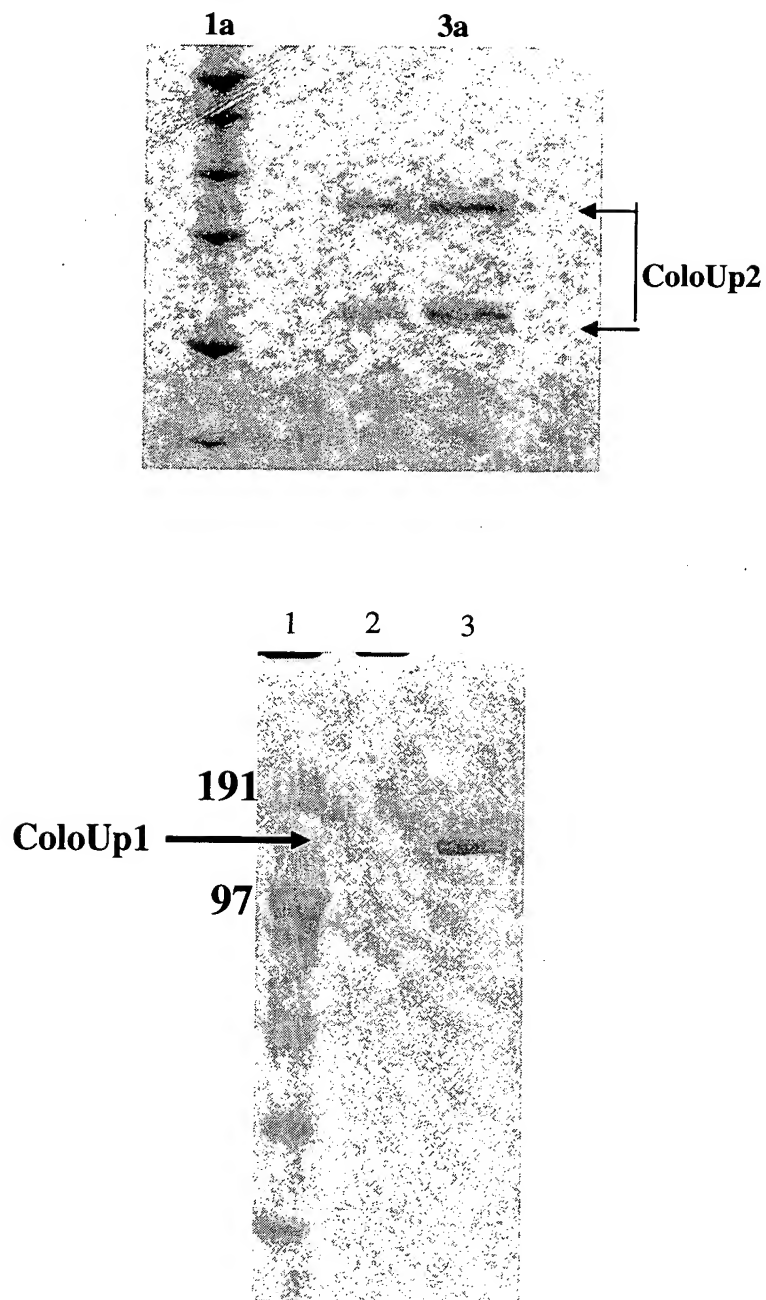


Figure 38

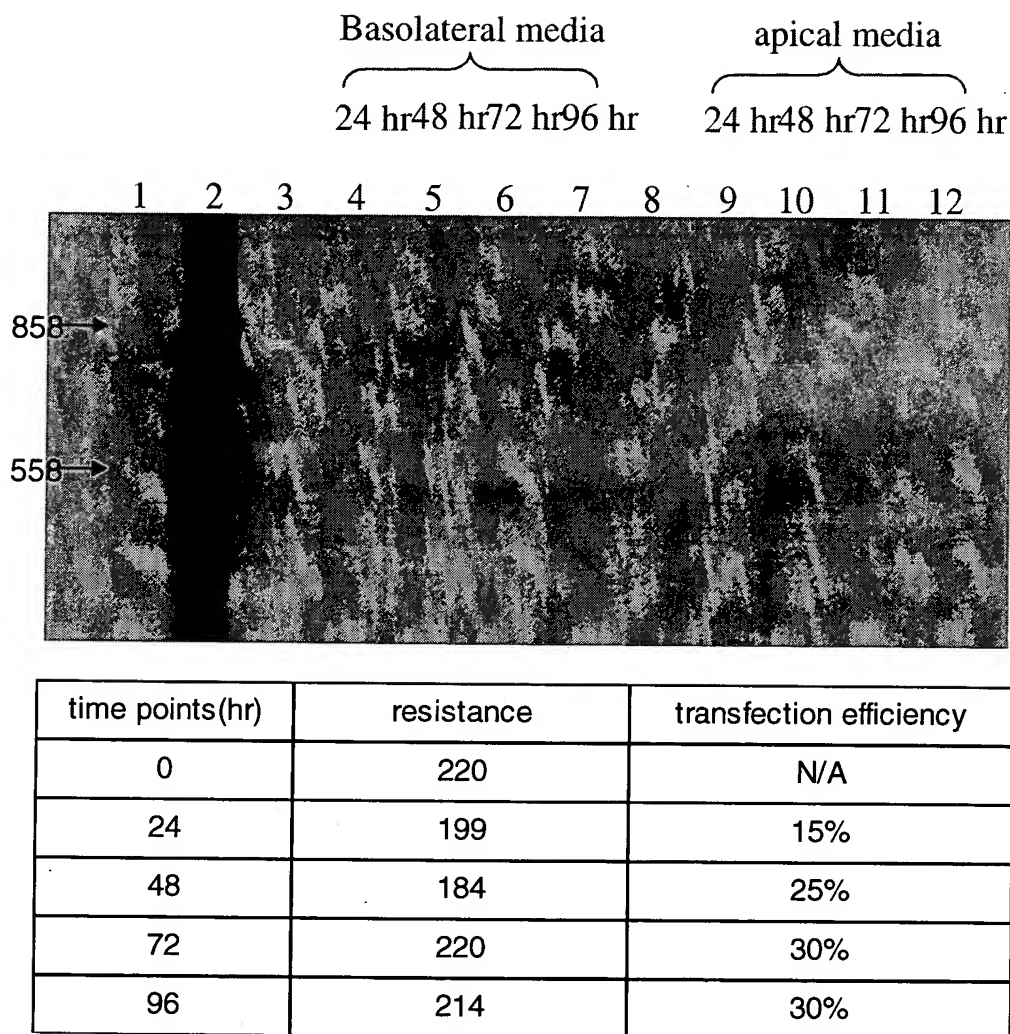
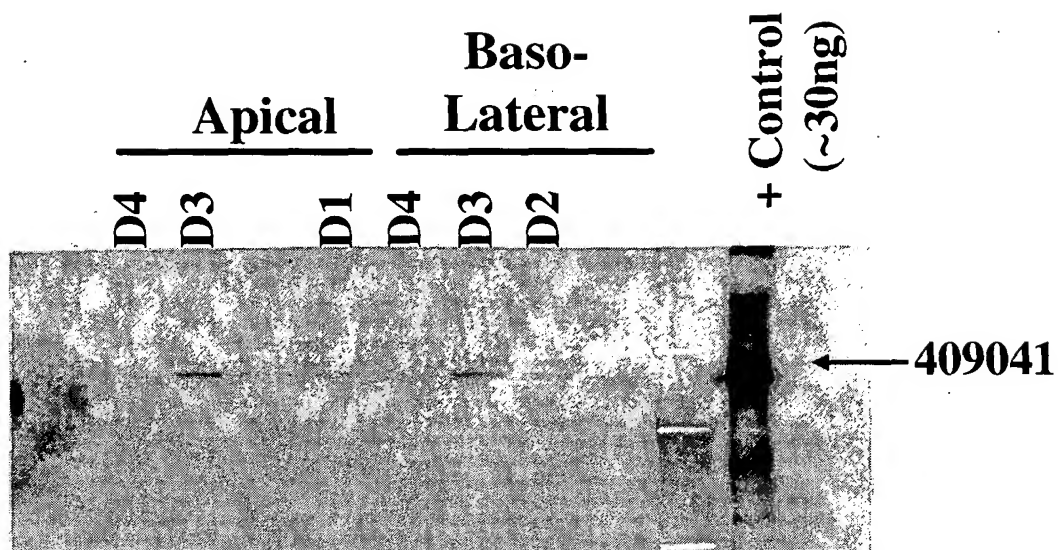


Figure 39



Day	Resistance	% GFP Exp.
0	300	0
1	415	10
2	260	20
3	206	25
4	218	25

Figure 40

Amino Acid Sequence of a Secreted C-terminal Portion of ColoUp2

AVLAAHCPFYSWKRVFLTHPATCYRTTCPGPCDSQPCQNGGTCVPEGLDGYQCL
CPLAFGGEANCALKLSLECRVDLLFLLDSSAGTTLDGFLRAKVFKRFVRAVLSE
DSRARVGVATYSRELLVAVPVGEYQDVPDLVWSLDGIPFRGGPTLTGSALRQAA
ERGFGSATRTGQDRPRRVVLLTESHSEDEVAGPARHARARELLLLGVGSEAVR
AELEEITGSPKHVMVYSDPQDLFNQIPELQGKLCSRQRPGCRTQALDLVFMLDTS
ASVGPENFAQMMSFVRSCALQFEVNPDVTQVGLVVYGSQVQTAFGLDTKPTRA
AMLRAISQAPYLGGVGSAGTALLHIYDKVMTVQRGARPGVPAVVVLTGGRGA
EDAAVPAQKLRNNGISVLVVGVPVLSEGLRRLAGPRDSLHVAAAYADLRYHQD
VLIEWLCGEAKQPVNLCKPSPCMNEGSCVLQNGSYRCKCRDGWEGPHCENRFL
RRP (SEQ ID NO:21)

Figure 41